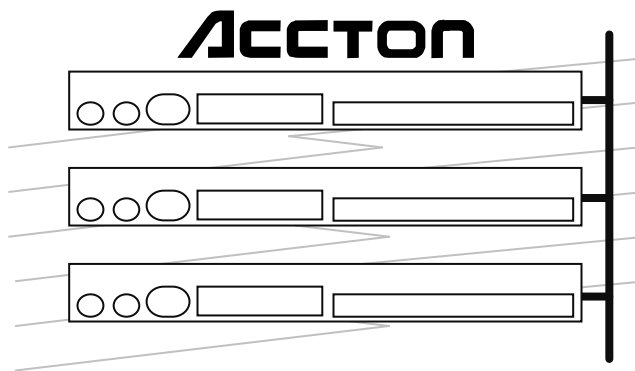


# EtherHub 1500 System

## User's Guide

- ◆ EtherHub-16i<sup>+</sup>
- ◆ EtherHub-16mi<sup>+</sup>



# **EtherHub 1500 System**

## User's Guide

- ◆ EtherHub-16i<sup>+</sup>
- ◆ EtherHub-16mi<sup>+</sup>

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*International Headquarters*

No. 1 Creation Road III,  
Science-based Industrial Park  
Hsinchu 300, Taiwan, R.O.C.  
Phone: 886-35-770-270  
FAX: 886-35-770-267  
BBS: 886-35-770-654  
Internet: support@accton.com.tw

*USA Headquarters*

1962 Zanker Road  
San Jose, CA 95112  
Phone: 408-452-8900  
FAX: 408-452-8988  
BBS: 408-452-8828  
FAST FAX: 408-452-8811

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EH1501s  
EH1502s  
E0895-R01  
150482-101

## FCC Warning

---

This equipment has been tested and found to comply with the limits for a Class A digital device pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment.

This equipment generates, uses, and can radiate radio frequency energy, and if not installed and used in accordance with the instruction manual may cause harmful interference to radio communications. Its operation in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.

A shielded transceiver cable is required to be used in order to ensure compliance with FCC Part 15; it is the responsibility of the user to provide such cable.

Changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

### **Canadian Standards Association (CSA) Statement**

This digital apparatus does not exceed the Class A limits for radio noise emissions from digital apparatus as set out in the radio interference regulations of the Canadian Department of Communications.

# Sicherheitshinweise

---

1. Die Steckdose muß sich in der Nähe des Gerätes befinden und leicht zugänglich sein.
  2. Zum Reinigen den Stecker aus der Steckdose ziehen. Beim Reinigen keine Flüssigreiniger oder Sprays verwenden, sondern ein angefeuchtetes Tuch.
  3. Das ..... gerät nicht in Naßräume oder in der Nähe von Wasser benutzen, wie z.B. Badezimmer, Schwimmbad, Spülbecken usw. . Das Eindringen von Wasser kann zur Zerstörung des Gerätes führen.
  4. Das ..... gerät nicht auf einer unstabilen Unterlage, wie z.B. Rollwagen, Gestell usw., aufstellen. Es könnte herunterfallen und Verletzungen oder Beschädigungen von Mensch und Gerät verursachen.
  5. Die Belüftungsöffnungen nicht blockieren oder auf falscher Oberfläche, wie Bett, Sofa usw., stellen. Durch die Blockierung kann es zur Zerstörung des Gerätes durch Überhitzung kommen.
  6. Versuchen Sie niemals dieses Gerät selbst zu warten, da beim Öffnen oder Abnehmen des Gehäuses die Gefahr eines elektrischen Schlages besteht.
  7. Keine Gegenstände auf das Anschlußkabel stellen, damit es nicht durch scharfe Kanten zerstört werden kann.
  8. Keinerlei Gegenstände durch die Öffnungen in das Gerät stecken, da es dadurch sonst zu Kurzschlüssen kommen kann.
  9. Bei Störungen des Gerätes den Wartungsdienst verständigen.
  10. Bei Reparaturen dürfen nur Originalersatzteile oder Bauteile mit gleichen Eigenschaften verwendet werden. Andere Bauteile können Feuer, elektrischen Schlag oder andere Gefahren verursachen.
  11. Nach Beendigung von Wartungsarbeiten oder Reparaturen durch den Kundendienst sollte die Sicherheitsprüfung durchgeführt werden.
  12. Bei längerem Stillstand des Gerätes, ist diese von der Versorgungsspannung zu trennen. Dies verhindert eine Beschädigung des Gerätes durch eine Überspannung in der Zuleitung.
- Der arbeitsplatzbezogene Lärmschutzpegel nach DIN 45 635 ist kleiner 70dB (A).

## About this Guide

---

This is an installation guide for the EtherHub 1500 hubs — EtherHub-16i<sup>+</sup> and EtherHub-16mi<sup>+</sup>. It covers the following topics:

- Product description, summary of important features and specifications
- Brief description of the EtherHub 1500 System
- Description of significant components of the unit including LED indicators, ports, buttons and switches
- Hardware installation procedure
- System setup and configuration
- Applications

# Package Contents

---

Carefully unpack the contents of the package and verify them against the checklist given below. This checklist applies to both the EtherHub-16i<sup>+</sup> and EtherHub-16mi<sup>+</sup> unless otherwise specified.

## Package Checklist

- ☒ EtherHub-16i<sup>+</sup> (Model No. EH1501s) or EtherHub-16mi<sup>+</sup> (Model No. EH1502s)
- ☒ One AC power cord
- ☒ 0.5 meter FlexBus 1500™ cable
- ☒ Four rubber feet
- ☒ BNC T-type connector and two 50-ohm ( $\Omega$ ) terminators (for models with the BNC transceiver module only)

In addition, the EtherHub-16mi<sup>+</sup> package includes the following:

- ☒ One serial RS232 connector module which includes 2 DB9 to RJ-45 converter connectors, one DB25 to RJ-45 converter connector, and one 3-meter parallel UTP cable
- ☒ Diskette containing -  
Accton's EtherHub 1500 System Configuration Program

Please inform your dealer immediately should there be any wrong, missing, or damaged parts.

If possible, retain the carton, including the original packing materials. Use them again to repack the unit in case there is a need to return it for repair.

To qualify for product updates and product warranty registration, fill in the **Owner Registration Card** and return it to Accton Technology Corporation.

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# Chapter 1: Overview

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## The EtherHub 1500 System

The EtherHub 1500 System is a powerful and innovative LAN network enhancement and management product series. Each component in the system supports a multi-segment bus architecture that enhances traffic management and network bandwidth utilization. This system offers the network manager a wide range of flexible configuration options, allowing you to effectively increase your network's bandwidth. In addition, the entire installation can be monitored and controlled through any network management station.

*The major components of this network system include:*

**EtherHub-16mi<sup>+</sup>**, a 16-port intelligent hub with an SNMP-based network management agent for monitoring and controlling various network components. It includes -

- 16 RJ-45 STP station ports for connecting computers to the network using shielded or unshielded twisted-pair cable
- 1 optional port for installing an AUI, BNC or Fiber-Optic module, which permits connection to thick or thin Ethernet or 10BASE-F cable
- 2 FlexBus 1500 ports for connecting to compatible hubs via a FlexBus 1500 STP cable
- RJ-45 port 16 which can also be converted to a daisy-chain port (↗) using the daisy-chain switch
- SmartWatch™ LED panel that provides an easy way to configure and monitor the system

In addition, this hub supports a multi-segment bus architecture that enhances traffic management and network bandwidth utilization. With an SNMP agent, this unit not only functions as an intelligent hub, but can also monitor up to 10 intelligent hubs connected to it (including itself) through the FlexBus 1500 port connection. The EtherHub-16mi<sup>+</sup> conforms to both the IEEE 802.3 repeater specification and the Simple Network Management Protocol (SNMP).

This hub supports both in-band and out-of-band management. For in-band management, it uses Accton's optional Network Management Software, called AccView/Open (not included with this package) to monitor and control a stacked system. For out-of-band management, the device's RS232 port can be connected to a PC and managed using Accton's EtherHub 1500 System Configuration Program. Any computer (i.e., XT, AT) with a COM1~4 RS232 port, at least 640 KB on-board memory, and a monochrome, EGA or VGA display can be used.

The Etherhub-16mi<sup>+</sup> can be configured as a stand-alone system to form a simple LAN networking 2 to 16 computers using the RJ-45 ports. Or it can be connected to other hubs using the FlexBus 1500 port connection. Further network expansion can be achieved using the BNC, AUI or fiber-optic trunk port connection (optional ALT PORT), or the RJ-45 daisy-chain port. Workstations are connected to the EtherHub-16mi<sup>+</sup> station ports using shielded or unshielded twisted-pair cable.

**EtherHub-16i<sup>+</sup>**, a 16-port intelligent 10BASE-T hub. It includes -

- 16 RJ-45 STP station ports for networking computers to the network using shielded or unshielded twisted-pair cable (STP or UTP).
- 1 optional port for installing an AUI, BNC or Fiber-Optic module, which permits connection to thick or thin Ethernet or 10BASE-F cable.
- 2 FlexBus 1500 ports for connecting to compatible hubs or to the EtherHub-16mi<sup>+</sup> via a FlexBus 1500 cable.
- RJ-45 port 16 which can be converted to a daisy-chain port (X) using the daisy-chain switch.
- Comprehensive LED indicators on the front panel to provide easy and quick configuration and monitoring the unit.

As an intelligent hub, the EtherHub-16i<sup>+</sup> collects port statistics and records events for system administration. When stacked with other intelligent hubs through the FlexBus 1500 ports and connected to an SNMP management device (e.g., EtherHub-16mi<sup>+</sup>), you can monitor and control all attached hubs through in-band and out-of-band communication.

The EtherHub-16i<sup>+</sup> can be used in a stand-alone configuration to form a simple LAN networking 2 to 16 computers using the RJ-45 ports. Further network expansion can be achieved using the BNC, AUI or fiber-optic trunk port connection (optional ALT PORT), or the RJ-45 daisy-chain port. Workstations are connected to the EtherHub-16i<sup>+</sup> station ports using shielded or unshielded twisted-pair.

**AccView/Open** (SW6102), a Windows-based network management software package that analyzes and displays data from the EtherHub-16mi<sup>+</sup> and transmits commands from the user to the EtherHub-16mi<sup>+</sup>. AccView should be installed on the network management station (i.e., any workstation used to manage the network). If segmented architecture is used, the network management station should be on the same segment as

the SNMP management agent (i.e., EtherHub-16mi<sup>+</sup>). The network management station can be a 386 or 486 workstation with a 10MB hard disk, at least 2 MB on-board memory, a VGA display, and running Windows version 3.1 or higher (i.e., Windows 3.1, 3.11, '95, NT).

**AccView/Open EtherHub Manager**, is network management software specifically designed to manage Accton's EtherHub family. This software can be integrated into the following third-party management platforms -

- SunNet Manager/Sparc (SW6120-1)
- SunNet Manager/X86 (SW6120-2)
- OpenView/Windows (SW6121)
- OpenView/Sparc (SW6122)
- Novell Netware Management System (SW6124)

**Alternative Interface Module -**

- BNC (EH1551), default module preinstalled in EH1500
- AUI (EH1552)
- Fiber Optic (EH1553)

**Security Kit** (SW7300), for intrusion/eavesdropping protection

## **Features of EtherHub 1500 System**

- Conforms to the SNMP & IEEE Hub Management Standards, MIB I and MIB II
- Conforms to the IEEE 802.3 repeater specification and the 10BASE-T standard
- Manages up to 10 concentrators using the FlexBus 1500 (STP) cable
- One optional port (BNC, AUI or Fiber-Optic) for connecting to any Ethernet media via slide-in alternative module transceiver

- Provides one serial 9-pin RS232 port for out-of-band network management (EtherHub-16mi<sup>+</sup> only)
- Supports daisy chaining by using a daisy-chain switch to convert port 16 to a daisy-chain port
- Automatic polarity detection and correction permits automatic recovery due to wiring errors
- Automatically partitions bad port to protect network
- Adapts to universal wide range voltage power (i.e., 100V AC to 240V AC +/- 10%, 50~60 +/- 3Hz)
- Flexible installation for desktop, wall mount, or rack installation (standard 19" size)

## **Distinguishing Factors of EtherHub 1500 System**

- Provides multi-segment architecture allowing the network to be split into three segments
- Includes a SmartWatch™ comprehensive LED indicator panel for reporting network activity, unit configuration and facilitating problem diagnosis
- Automatic ID assignment and auto-terminator setting for auto-configuration
- Supports fault-tolerant configuration by allowing port link backup and agent backup
- Two FlexBus 1500 management ports (BUS IN/OUT) for a bundled cable containing 3 separate Ethernet segments and a management link
- Provides front panel configuration using a Configure button

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## **EtherHub 1500 System User's Guide**

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- Supports out-of-band management (using Accton's proprietary EtherHub 1500 System Configuration Program), and full software configurable in-band management using the optional AccView/Open (network management software)
- Flash ROM on board the EtherHub-16mi<sup>+</sup> for easily updating the SNMP agent using AccView/Open's download option
- Stacked hubs can be distributed up to 100-meters in a single segment configuration

# Chapter 2: Hardware Description

This chapter describes the hardware features of the EtherHub-16i<sup>+</sup> and EtherHub-16mi<sup>+</sup>. Except for 3 LED indicators that are unique to each hub, both products have similar indicators and other front panel components. Likewise, the rear panel is similar for both versions, except that the EtherHub-16i<sup>+</sup> does not support the RS-232 serial port. Before connecting any network device to the hub, read this chapter carefully. For easier management and control of the hub, familiarize yourself with the front panel indicators and Configure button.

## Front Panel Displays

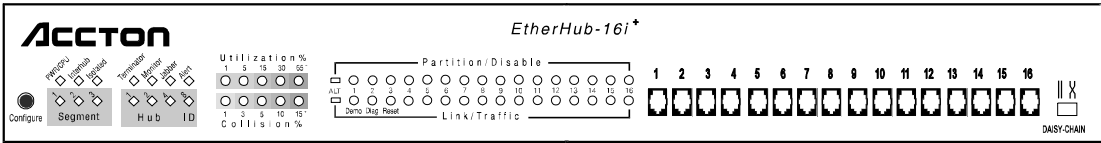


Figure 2.1 The EtherHub-16i<sup>+</sup> Front Panel

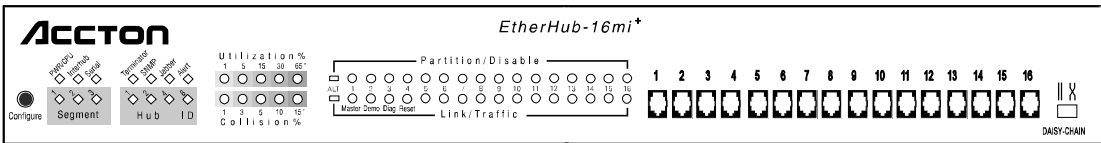


Figure 2.2 The EtherHub-16mi<sup>+</sup> Front Panel

SmartWatch™ LED Panel

Both hubs have a SmartWatch™ LED panel that includes comprehensive indicators for monitoring the device and network status. A quick glance at the front panel tells you if the unit's power is ON, if it is monitoring another hub (or concentrator), or if a problem exists on the network. The following sections describe the function of each indicator.

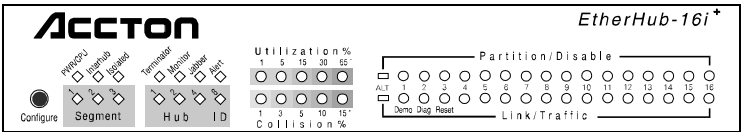


Figure 2.3 SmartWatch™ LED Panel for EtherHub-16i<sup>+</sup>

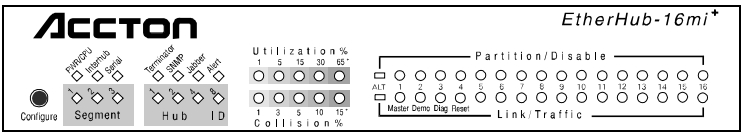


Figure 2.4 SmartWatch™ LED Panel for EtherHub-16mi<sup>+</sup>

**PWR/CPU**

Color: Green  
Label: PWR/CPU  
Function: Power indicator

LED Activity	Condition	Indication
STEADY LIGHT	ON	Unit is receiving power, CPU is running, and EH1502s Agent is in Master mode.
BLINKING LIGHT	ON	Unit is receiving power, CPU is running, and EH1502s Agent is in Slave mode.
NO LIGHT	OFF	Power is disconnected; no power received.

**Interhub**

Color: Green  
Label: Interhub  
Function: Indicates a valid connection between hub and agent

LED Activity	Condition	Indication
BLINKING LIGHT	ON	Hub has a valid connection to the Agent through the FlexBus 1500 port on the back plane.
NO LIGHT	OFF	Hub is in a stand-alone configuration. Or hub does not have a valid connection to the network system it monitors.

**Isolated (EtherHub-16i<sup>+</sup> only)**

Color: Green  
Label: Isolated  
Function: Indicates the hub is isolated from Ethernet segment of the FlexBus 1500 backplane

LED Activity	Condition	Indication
STEADY LIGHT	ON	Hub is isolated from all segments.
NO LIGHT	OFF	Hub is attached to one of the 3 segments of the FlexBus 1500.

**Serial (EtherHub-16mi<sup>+</sup> only)**

Color: Green

Label: Serial

Function: Indicates connection to a management console

LED Activity	Condition	Indication
BLINKING LIGHT	ON	Agent has a valid connection to a management console using its RS232 serial port. A valid link only occurs when the management console is sending a message to or receiving a message from the agent.
NO LIGHT	OFF	No connection to a management console.

**Terminator**

Color: Green

Label: Terminator

Function: Indicates if a unit is located in a terminal position in a stacked system

The unit has an auto-terminate function that is enabled when it is at the end of a stack. In a stand-alone configuration, this LED is ON because of the auto-terminate function.

LED Activity	Condition	Indication
STEADY LIGHT	ON	The hub is at the end of a stacked system or in a stand-alone configuration.
NO LIGHT	OFF	The hub is connected to a stacked system, but not at the terminal position of a stack.

**Monitor** (EtherHub-16i<sup>+</sup> only)

Color: Green

Label: Monitor

Function: Indicates that an SNMP management agent is connected to and managing the hub

LED Activity	Condition	Indication
BLINKING	ON	Hub is connected to and managed by an Agent.
NO LIGHT	OFF	Hub is not connected to an Agent.

**SNMP** (EtherHub-16mi<sup>+</sup> only)

Color: Green

Label: SNMP

Function: Indicates that an SNMP frame is being received by the Agent

LED Activity	Condition	Indication
BLINKING LIGHT	ON	Hub is presently receiving an SNMP frame.
NO LIGHT	OFF	Hub is not receiving an SNMP frame.

In a stacked system where a Master and Slave agent exist, the SNMP LED of the active agent will blink if an SNMP frame is received. Normally, this would mean that the Master agent's SNMP LED will be ON. However, if the Master agent fails, the Slave agent's SNMP LED should light up. See the section on Master Agent in Chapter 4 for related information.

**Jabber**

Color: Red  
Label: Jabber  
Function: Jabber lock-up indicator

Jabber refers to an abnormal Ethernet frame transmission. The frames causing jabber are normally much too long. This may result from a malfunctioning Ethernet card and may cause data loss for all network users.

LED Activity	Condition	Indication
STEADY LIGHT	ON	Jabber exists on one or more port connection (i.e., RJ-45 or ALT port).
NO LIGHT	OFF	No jabber occurring.



**IMPORTANT!** To identify the port causing the problem, check all existing connections one by one, as follows:

1. Select a port to check.
2. Then unplug its cable connection while checking the Jabber display. If the Jabber LED goes OFF, you have successfully identified the defective port. However, if the light remains ON, the port is in good condition.
3. Replug the cable connection, and select another port to test.
4. Repeat this procedure until you find the port causing the problem.

**Alert**

Color: Yellow

Label: Alert

Function: Indicates hardware or hub ID setting problems

LED Activity	Condition	Indication
BLINKING LIGHT	ON	Hardware or hub ID setting error has occurred.
NO LIGHT	OFF	No abnormal occurrence.



The Alert LED indicates that the device has encountered a problem in one or more hardware components (e.g., EEPROM checksum error, or Configure button is locked). However, the unit can still function even if the Alert LED is on. It is also used as a diagnostic test LED. Refer to the section on *Diagnostic Test LED Indicators* later in this chapter for more information.

**Utilization**

Label (%)	Color	Function
1% 5% 15%	Green	Indicates percentage utilization of LAN bandwidth.
30%	Amber (yellow)	
65+%	Red	

The Utilization LEDs indicate the percentage of network bandwidth used by valid data. The hub updates this display every 0.5 seconds.

There are 5 LEDs representing the percentage of network utilization. The corresponding LEDs light to show that the percentage utilization of LAN bandwidth has reached this level. When active, these LEDs look like a stereo's equalizer display.

For example, if network utilization reaches 1%, the LED labeled 1% will light. However, if network utilization rises above 1% (e.g., 30%), the LED labeled 30 and all the other LEDs before it (i.e., 1, 5, and 15) will light in rapid succession.

These LEDs monitor the share of valid network frames transmitted by this hub within a 10Mbps bandwidth. They provide a quick way to monitor the current traffic load relative to the network's capacity.

### Collision

Label (%)	Color	Function
1% 3% 5%	Green	Indicates the percentage of packet collisions occurring out of the total packets received by the hub.
10%	Amber (yellow)	
15+%	Red	

Collisions occur when two or more devices connected to a hub attempt to transmit data simultaneously on the network. When a collision occurs, devices pause and then re-transmit after a pseudo-random wait period. Because wait periods differ among devices, successive collisions become increasingly improbable.

The Collision LEDs assist the network manager in monitoring the percentage of packet collisions occurring relative to the total packets received by the hub. Similar to Utilization LEDs, the Collision LEDs have 5 numbers representing collision percentage. When collisions reach a level marked on the LED display, the corresponding LED lights up.

For example, if packet collisions reach 1%, the LED labeled 1% will light up. However, if collisions go beyond 1% (e.g., 15%), the LED labeled 15+ and all the other LEDs before it (i.e., 1, 3, 5, and 10) will also light up in rapid succession.



When more than 31 consecutive collisions occur on the cable segment connected to a port, that port is automatically partitioned by the hub. The hub automatically reconnects this port when a data packet longer than 512 bits (normal) is transmitted or received by the partitioned port without collision. This applies to all STP ports and the ALT PORT.

**Segment LED Indicators**

Color: Green

Label: 

Function: Indicates which segment is attached to the hub

There are 3 Ethernet segments embedded in the FlexBus 1500 ports located on the back plane of the EtherHub 1500 series. These units can be attached to any one of the three Ethernet segments. The 3-segment LED indicator displays a combination of ON/OFF lights to show which segment the unit is connected to. The table below shows the possible LED display combination of the segment indicators marked "1 2 3" and their corresponding meaning.

Segment			Description
1	2	3	
ON	OFF	OFF	Hub is connected to Segment 1 (Default)
OFF	ON	OFF	Hub is connected to Segment 2
OFF	OFF	ON	Hub is connected to Segment 3



The EtherHub-16i<sup>+</sup> can be completely isolated except for the management channel (which is reflected via the Isolated LED). However, the EtherHub-16mi<sup>+</sup> can not be physically isolated.

**Hub ID Indicators**

Color: Green

Label: 

Function: Indicates Unit ID Setting

In a stacked system, each hub unit has a unique ID. The EtherHub 1500 hub series is equipped with a function that automatically sets the hub ID, freeing the user from this task. The table below shows possible display combinations for the hub unit's ID LED indicators marked "1 2 4 8" and their corresponding meaning. These LEDs display the binary equivalent of the selected ID number (displayed left to right). In normal operation, the LEDs turned ON display a steady light; while in configuration mode, they blink.

Hub ID LED 1	Hub ID LED 2	Hub ID LED 4	Hub ID LED 8	Hub ID Number Setting
ON	ON	ON	ON	(DEFAULT) Used for automatic Hub ID setting.
ON	OFF	OFF	OFF	Hub ID 1
OFF	ON	OFF	OFF	Hub ID 2
ON	ON	OFF	OFF	Hub ID 3
OFF	OFF	ON	OFF	Hub ID 4
ON	OFF	ON	OFF	Hub ID 5
OFF	ON	ON	OFF	Hub ID 6
ON	ON	ON	OFF	Hub ID 7
OFF	OFF	OFF	ON	Hub ID 8
ON	OFF	OFF	ON	Hub ID 9
OFF	ON	OFF	ON	Hub ID 10

**Port Status Indicators**

There are 17 pairs of port status LED indicators. Each pair consists of a PARTITION/DISABLE LED (top row) and LINK/TRAFFIC LED (bottom row). Each pair (or column) has a label referring to the port number the LEDs monitor. For example, the port status LED pair labeled ALT monitors the optional port found at the rear panel (labeled ALT PORT). The other 16 pairs are for the RJ-45 ports on the front panel of the hub.

**PARTITION/DISABLE**

LED Activity	Condition	Indication
STEADY RED LIGHT	PARTITION	Indicates port partitioning due to an abnormal network condition.
BLINKING RED LIGHT	DISABLE	Indicates the port has been disabled
NO LIGHT	OFF	Port is in good condition.



The PARTITION/DISABLE LEDs are also used as diagnostic LEDs. Please refer to the *Diagnostic Test LEDs* section later in this chapter for more information.

**Partition**

A port is temporarily partitioned when a line error or too many collisions are detected on the attached segment. While it is automatically partitioned, the port continues to receive data from the segment. However, data is not transmitted onto the segment. When the problem is corrected or a valid data packet is received through the port, the port is automatically reconnected. When partitioning occurs, the port's corresponding PARTITION/DISABLE LED will be continually lit (RED light). Otherwise, this LED should be OFF (unlit).

**Disable**

Disabling a port is the same as manually partitioning it, except that you must also manually reconnect it. You can choose to partition a port even if there is nothing wrong with it. For example, to prevent a certain device from accessing the network or to reduce network traffic you may opt to disable the port. No incoming packet transmission can occur on a disabled port. Ports can be disabled/enabled using Accton's AccView/ Open or the EtherHub 1500 System Configuration Program. They can also be enabled by activating the factory default settings. See the section on Reset Mode in Chapter 4 for information on reverting to default settings.

**LINK/TRAFFIC**

LED Activity	Condition	Indication
STEADY GREEN LIGHT	ON	Indicates a valid link has been established on this port.
BLINKING GREEN LIGHT	ON	Indicates the port is receiving packets; blinking is proportional to the traffic passing through the port.
NO LIGHT	OFF	No valid link has been established on this port.

***Link***

The corresponding LINK/TRAFFIC LED should light up when a device (e.g., computer, hub or bridge) establishes a valid connection using the RJ-45 port. However, for the ALT PORT, no link connection is tested. The LINK/TRAFFIC LED for ALT only monitors the traffic condition.

***TROUBLESHOOTING***

If the LINK/TRAFFIC LED does not light up when a device is connected to its corresponding port, check that both the hub and connected device are powered on. For devices connected to the hub using an STP or UTP cable, check that the cable length does not exceed 100 meters. You should have standard, straight cables and not cross-over or other specialized cables.

***Traffic***

Traffic refers to the movement of packets being received by the port. A port's corresponding LINK/TRAFFIC LED will blink (ON) in proportion to the rate of traffic passing through the port. Through this LED, the network manager can easily view the activity on a port.

**Diagnostic Test LED Indicators**

The RJ-45 PARTITION/DISABLE LEDs not only monitor the partition or disabling of an RJ-45 port, they also monitor diagnostic test results.

LED Activity	Condition	Indication
BLINKING RED LIGHT	ON	The corresponding hardware component failed the diagnostic test.
NO LIGHT	OFF	The corresponding hardware component successfully passed the diagnostic test.

After power on, the hub automatically performs a diagnostic test. Seven hardware components are tested for EtherHub-16i<sup>+</sup>, while 14 components are tested for EtherHub-16mi<sup>+</sup>. During this test, STP PARTITION/DISABLE LEDs indicate the success/failure of each test. The following table shows what each PARTITION/ DISABLE LED monitors.

PARTITION/DISABLED LED Indicator	Test function/component	
	EtherHub-16i <sup>+</sup>	EtherHub-16mi <sup>+</sup>
1	CPU	CPU
2	ROM	Flash ROM 1
3	RAM	SRAM
4	Serial communication controller	LAN controller initialization
5	Hub control 1	LAN controller ID address
6	Hub control 2	LAN controller share memory
7	Timer	LAN controller loop back test
8	N.A.	LAN controller INT
9	N.A.	Hub controller 1
10	N.A.	Hub controller 2
11	N.A.	Stack management bus
12	N.A.	Serial port RS232 controller
13	N.A.	EEPROM
14	N.A.	Flash ROM 2

The system tests each component one at a time. The corresponding LED will display a blinking light (ON) after test completion to indicate which component failed the test. No light means all the hub components passed the diagnostics.

For EtherHub-16i<sup>+</sup>, the unit will complete the test cycle even if a problem is detected on any of the components. For EtherHub-16mi<sup>+</sup>, the unit will complete the test cycle for components 1 to 12 even if a problem is detected. However, if a problem is detected on components 13 or 14, the Alert LED and the corresponding PARTITION/DISABLED LED will immediately blink ON and the testing cycle will not be completed.

### Configure Button

On the left front panel is a button labeled *Configure*. Use this button for the following configuration functions:

- Segment Setting
- Hub ID Setting
- Master Agent Setting (only for EtherHub-16mi<sup>+</sup>)
- Demo (LED display demonstration)
- Diagnostics
- Reset

Move from one function to the next by using a "*long press*" on the button. LED indicators will light up depending on the selected system function. Make necessary choices within the current function using a "*short press*". Then, use a "*long press*" to effect your choice and move on to the next function. See Using the Configure Button in Chapter 4 for related information.



"Long press" in this User's Guide means pressing the Configure button for more than 2 seconds and then releasing it. "Short press" means pressing the Configure button and immediately releasing it. Also, if the button is not pressed within 10 seconds, the system returns to normal operation.

### STP Station Ports

The unit has sixteen RJ-45 station ports. Using shielded or unshielded (STP or UTP) twisted-pair cable, connect your workstation (via the network interface card's port) to any available RJ-45 port.

Port 16 can be converted into a daisy-chain port by enabling the Daisy-Chain switch (see the following section on the Daisy-Chain Switch for related information). Hence, this port also can be used to connect the unit to another compatible unit using STP or UTP cable.

### Daisy-Chain Switch

This switch is located on the right side of the front panel beside Port 16. It is used to enable/disable the daisy-chain function of said port. When the switch is enabled, Port 16 can be used as a daisy-chain port to link the unit to another compatible hub. When the switch is disabled, Port 16 can only be used as a station port. To enable daisy chaining, slide the switch to the right (X). To disable daisy chaining, slide it to the left (||).

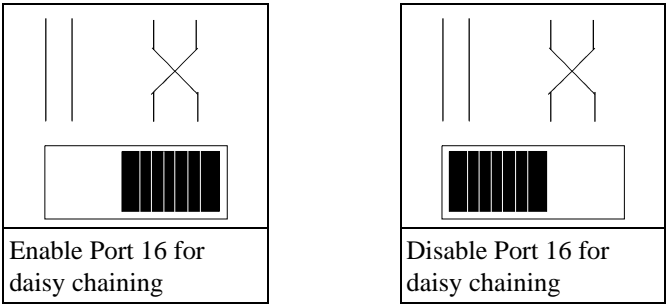


Figure 2.5 Daisy-Chain Switch Setting

## Rear Panel Displays

This section describes significant features of the unit's rear panel. See Figures 2.6 and 2.7 for illustration.

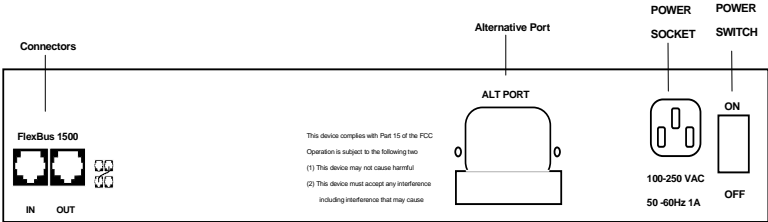


Figure 2.6 The EtherHub-16i<sup>+</sup> Rear Panel

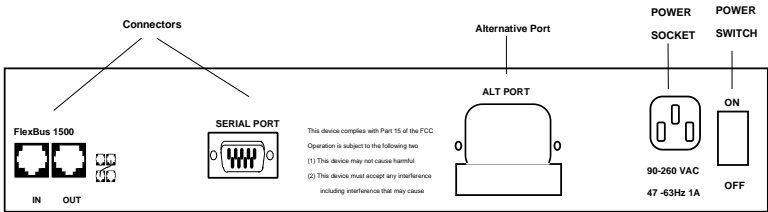


Figure 2.7 The EtherHub-16mi<sup>+</sup> Rear Panel

## Port Connections

### FlexBus 1500™

The unit has two FlexBus 1500™ connectors labeled BUS IN and BUS OUT for connecting the hub to a compatible hub or a network management agent. The FlexBus 1500 cable that comes with this package is used specifically for these ports. Only hubs cascaded through the BUS IN and BUS OUT connection can be managed by a network management agent.

***BUS IN***

Using a FlexBus 1500 cable, connect this port to the BUS OUT port of an EtherHub-16i<sup>+</sup> or any EtherHub 1500 series hub.

***BUS OUT***

Using a FlexBus 1500 cable, connect this port to the BUS IN port of an EtherHub-16i<sup>+</sup> or any EtherHub 1500 series hub.



The unit also supports "hot remove" for the FlexBus 1500 cable. This allows you to unplug the FlexBus 1500 cable while the unit is powered on.

**Serial Port (EtherHub-16mi<sup>+</sup> only)**

The unit has one 9-pin RS232 male connector labeled SERIAL PORT. It is used to connect a workstation or a modem for out-of-band communication using Accton's EtherHub 1500 System Configuration Program. Use the UTP cable and connection converter provided with your unit for plugging into a PC or modem.

**ALT Port**

The slot labeled ALT PORT is for an optional slide-in transceiver module. Three types of transceiver modules are available -

AUI (10BASE2) for thin Ethernet cable

BNC (10BASE5) for thick Ethernet cable (default)

Fiber optic (10BASE-F)

### **BNC Module (10BASE2)**

The BNC module has a built-in transceiver with a BNC port for connection using thin coaxial cable. The BNC port can link up to 30 hubs on a thin coaxial cable segment. The thin coaxial cable that links the BNC ports may be extended up to 185 meters and have computers or other Ethernet devices attached to it. When connecting two hubs via BNC ports, there should be at least 0.5 meters (about two feet) of coaxial cable between the two BNC ports. If the hub is at the end of an Ethernet cable, plug and lock the 50-ohm ( $\Omega$ ) terminators to the T-type connector on the BNC port.



Terminate an open end of any T-type connector that is plugged into a BNC port with a 50-ohm ( $\Omega$ ) terminator. In particular, when a hub using the BNC port connection is at the end of an Ethernet segment, terminate the open end of the T-type connector with a 50-ohm ( $\Omega$ ) terminator. Also, if the BNC port is not used, plug a T-type connector to it and terminate both ends with a 50-ohm ( $\Omega$ ) terminator.

### **Power Socket**

The power socket accepts AC power from 100 to 240V ( $\pm 10\%$ ) at 50 to 60 Hz ( $\pm 3\text{Hz}$ ). The hub is equipped with a universal full-range power source.

### **Power Switch**

The power switch is located at the right side of the rear panel. It is used to power the unit ON/OFF.

## Chapter 3: Hardware Installation

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This chapter describes how to install the hardware unit.

### Before You Begin

1. Before installing the hub, verify that the electrical values meet the following specifications.

AC Power	Frequency
100 to 240V ( $\pm 10\%$ )	50 to 60Hz ( $\pm 3\text{Hz}$ )

The hub is equipped with a power supply that automatically detects the input voltage level.

2. Leave at least 10 cm. of space at the front and back of the hub for ventilation. We recommend that the hub be installed in a cool and dry area.
3. If you plan to stack the hubs in a mounting rack or directly on top of one another, make sure you have all the mounting screws, brackets, and tools you need for proper installation.

## Hardware Installation

1. Find a location for the hub.

The unit is suitable for desktop or rack-mount installation. A good location is at the center of all the devices you want to link, close to the trunk segment, and near a power outlet.



The EtherHub 1500 hubs can be stacked with other hubs using a mounting rack or directly on top of one another through the FlexBus 1500 ports. Refer to the sections on *Stacking Hubs without a Rack* or *Mounting Hubs on a Rack* for a description of these methods.

If you don't want to stack the hub with other hubs now, skip this step and proceed to *Connecting the Hub System*.

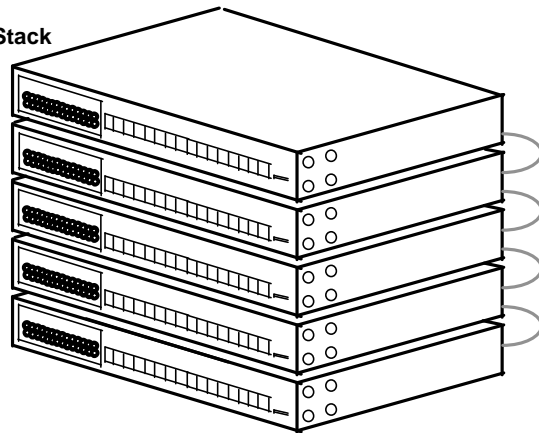
If you plan to use the hub in a stand-alone configuration, go to Step 4 under *Connecting the Hub System*.

2. Connect the hub to compatible hubs (e.g., the EtherHub-16i<sup>+</sup> or EtherHub-16mi<sup>+</sup>) through the FlexBus 1500 ports. Use either of the two methods mentioned in this section.

### Stacking Hubs without a Rack

1. Stick a self-adhesive rubber foot (comes with this package) on the 4 hollow spaces at the bottom of the first hub.
2. Place the first hub in the area where you want the stack to be installed.
3. Repeat step 1 for each hub before stacking them. The rubber feet cushion the hubs against shock/vibration and provide space between each hub for ventilation.

**EtherHub1500 Hub Stack  
(Up to 10 Hubs)**



*Figure 3.1 Stacking Hubs without a Rack*

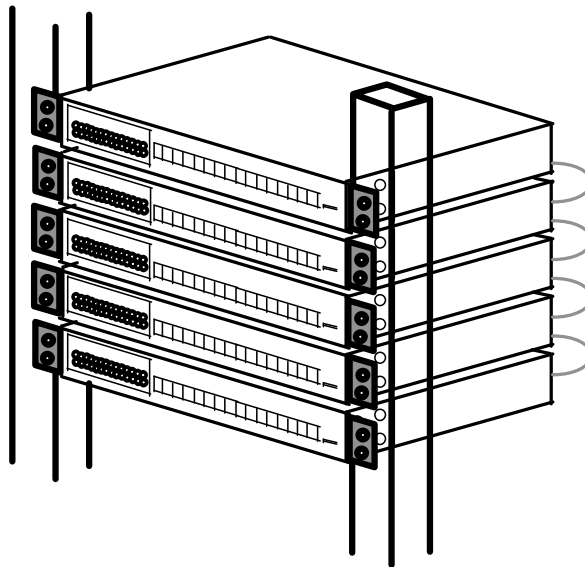


The two mounting brackets and screws on the sides of the hub need not be removed if you do not mount the hub in a rack. Keep the mounting brackets and screws, however, for possible future use.

## Mounting Hubs on a Rack

1. Confirm that the rack you will use is an EIA standard-size 19-inch rack.
2. Use the screws provided with the mounting rack to mount the hub using the hub's mounting brackets.

**EtherHub1500 Hub  
(Up to 10 Hubs)**



*Figure 3.2 Mounting Hubs Using a Mounting Rack*

## Connecting the Hub System

1. Plug one end of the FlexBus 1500 cable (provided) in the BUS OUT port of the top hub and the other end to the BUS IN port of the next hub. Repeat this step for each hub in the stack. The top hub should only have one FlexBus 1500 port in use (BUS OUT). Refer to the FlexBus 1500 section in Chapter 2 for related information.



**Hubs in a stack can only be managed by the network management agent through the FlexBus 1500 connection.** In a stacked system, we therefore recommend that you use the FlexBus 1500 ports to make BUS OUT to BUS IN connections with a network management agent (EtherHub-16mi<sup>+</sup>) or any EtherHub 1500 series hubs.

You can also cascade hubs using the daisy-chain port (Port 16). However, Hubs cascaded using the daisy-chain port cannot be managed by the management agent. See **Step 2** for details.

2. Cascade hubs using the daisy-chain port (Port 16). RJ-45 port 16 can be converted into a daisy-chain port using the daisy-chain switch. To daisy chain, slide the daisy-chain switch to the right (↗), and plug one end of an STP or UTP cable to Port 16 and the other end to any RJ-45 port of a compatible hub. (However, you must not plug both ends to a daisy-chain port.) Using this type of connection, you can cascade up to 4 hubs.



Do not plug in a phone jack connector to the RJ-45 port. This may damage the hub. Instead, use only shielded or unshielded twisted-pair cables with RJ-45 connectors that conform with FCC standards.

3. Connect the hub to an Ethernet trunk, if necessary. (Applies only to hubs with a slide-in module transceiver installed in the ALT PORT.)

For the default slide-in module, plug the BNC T-type connector into the BNC port of the hub, and use this port to connect the device to the RG-58A/U thin Ethernet trunk. If the unit is at the terminal end of a trunk segment, connect a 50-ohm ( $\Omega$ ) terminator to the open end of the "T" connector. If the Ethernet BNC trunk port has no connection, plug in the BNC T-type connector and lock both ends with a 50-ohm ( $\Omega$ ) terminator.

4. Connect workstations to the hub.

Prepare the workstations you wish to network. Make sure they have properly installed 10BASE-T network interface cards, or external 10BASE-T transceivers.

Prepare STP or UTP cables with RJ-45 plugs at both ends. The length of each cable should not exceed 100 meters.

Connect one end of the cable to the RJ-45 port of the PC's network interface card. Connect the other end to an available station port on the hub.

5. Install the power cord and power on the hub.

Plug the power cord into the power socket at the rear of the hub. Then connect one end of the cord to an electric outlet.

Power on the hub by pressing the power switch to ON. Check the LED indicator marked PWR/CPU on the front panel. It should be ON.

The hub will perform a diagnostic test upon power on. Refer to the section on Diagnostic Test LED Indicators in Chapter 2 for more information.

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## EtherHub 1500 System User's Guide

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The unit will automatically select the setting that matches the input voltage connected. Therefore, no additional adjustments are necessary when connecting it to any input voltage within the range marked on the rear panel.



The unit supports a "hot remove" feature which permits you to connect/disconnect cables without powering off the hub and without disrupting the operation of the hubs in stack.

### Preparing for System Configuration

If you are installing the EtherHub-16mi<sup>+</sup>, prepare it for out-of-band management, if necessary.

#### Local Out-of-Band Configuration

If you use a local PC to configure the EtherHub 1500, connect the converter for the PC's COM port (COM1, COM2, COM3 or COM4) to the converter for the EtherHub-16mi's serial port (RS232) using the UTP cable with DB9 connectors at both ends - provided as part of the Product Package.

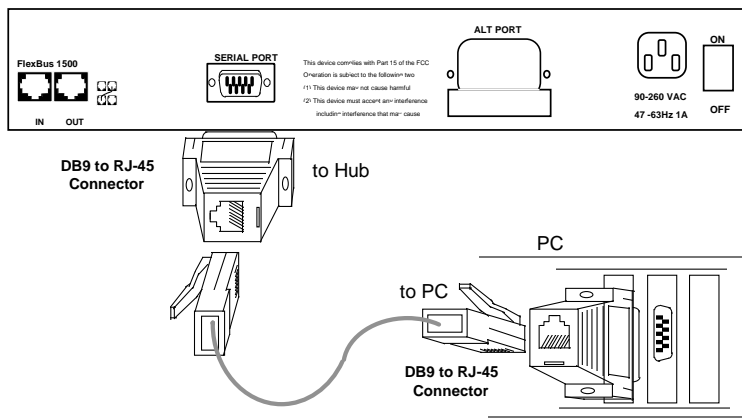


Figure 3.3 Connecting the Hub's RS232 Serial Port to a PC COM Port

### Remote Out-of-Band Configuration

If you use a remote PC to configure the EtherHub 1500 via modem connections, at the remote site make sure the modem's baud rate is 9600 and that the AT command is supported.

#### ***EtherHub 1500 Site***

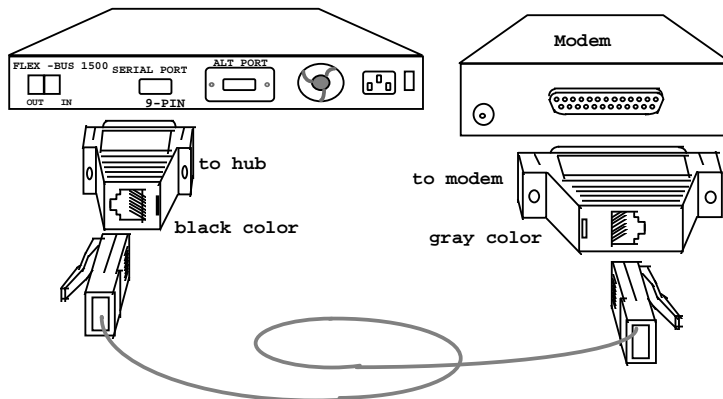
Connect the DB9 to RJ45 converter for the EtherHub-16mi's serial port (RS232), and a DB25 to RJ45 converter for the modem's serial port (RS232) using the UTP cable provided. You do not have to set the modem, because the EtherHub-16mi<sup>+</sup> will automatically configure it to auto-answer mode.



The DB9 to RJ-45 and DB25 to RJ-45 converter connectors come with this package.



Make sure the modem's baud rate is set to 9600.



*Figure 3.4 Connecting the Hub's RS232 Serial Port to a Modem*

#### ***Remote Site***

At the PC site, connect the PC's COM port (COM1, COM2, COM3 or COM4) to the modem's serial port (RS232) using the UTP cable.

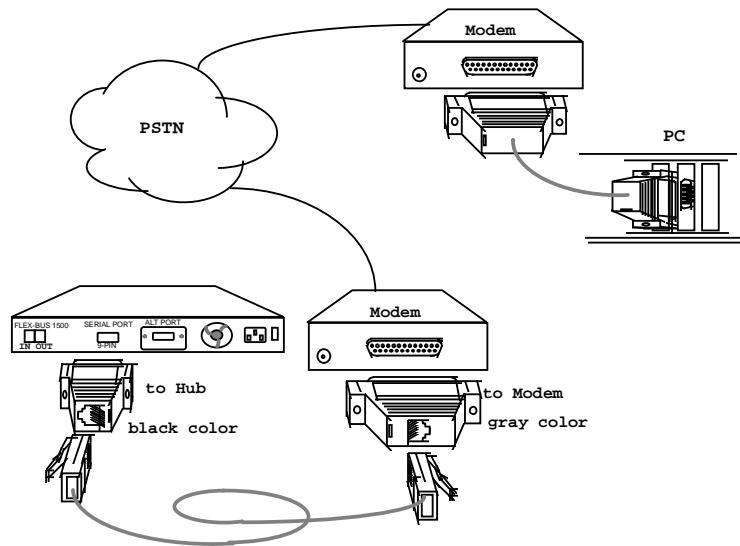


Figure 3.5 Connecting the Remote PC's RS232 Serial Port to a Modem

### **Running the Out-of-Band Configuration Program**

Run Accton's EtherHub 1500 System Configuration Program. See the section on Accton's EtherHub 1500 System Configuration Program in Chapter 4 for more information.

### In-Band Configuration

If you use AccView/Open or other network management software to configure the EtherHub 1500, then set up your in-band Network Management Station.

The in-band network management station is the personal computer used to run your network management software. It should be connected to any available RJ-45 port of the stacked system and on the same segment as the SNMP management agent.

Accton's EtherHub 1500 System has Windows-based network management software called AccView/Open. Any PC running the AccView/Open program can serve as your in-band network management station. Inquire with your Accton dealer on how to acquire this package. Also note that the AccView/Open EtherHub Manager can be integrated into third-party management platforms as described in Chapter 1.



After hardware installation, you can also configure the hub using the Configure button. For the EtherHub-16mi<sup>+</sup>, we recommend using Accton's in-band network management software (AccView/Open) or the out-of-band program. Proceed to *Chapter 4* for details.

### Installing an SNMP Backup Agent

If you are performing first time installation, just connect two Agents and let the system automatically choose the Master agent and the Slave agent.

If you are adding a slave agent to an existing system, perform the following steps:

1. Before connecting to the system, set the target SNMP agent to Slave mode using the Configure button. Be sure the PWR/CPU LED is ON (i.e., blinking).

2. Turn it off again before exceeding 30 seconds to prevent it from returning to a Master mode.
3. Add the newly configured Slave agent to the Hub stack using the FlexBus 1500 cable.
4. Turn the Slave agent on again. The new agent will start to function as a backup to the SNMP system.

# Chapter 4:

## Setup and Configuration

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### System Setup

#### Diagnostic Tests

##### Upon Power On

Upon power on, the system performs an internal self-diagnostic test of major hub components. If any component fails during the test, the hub will try to complete the diagnostic procedure. Otherwise, the system will hang. For related information, refer to Diagnostic Test LED Indicators in Chapter 2.

The following table shows the components to be tested.

Test Function/Component	
EtherHub-16i+	EtherHub-16mi+
CPU	CPU
ROM	Flash ROM 1
RAM	SRAM
Serial communication controller	LAN controller initialization
Hub control 1	LAN controller ID address
Hub control 2	LAN controller loop back test
Timer	LAN controller INT
	Hub controller 1
	Hub controller 2
	Stack management bus
	Serial port RS232 controller
	EEPROM
	Flash ROM 2

### **During Normal Operation**

You can use the **Configure** button any time you want the system to perform a diagnostic test. However, when testing begins, the system leaves normal operation. If no problem is encountered by diagnostics, the system automatically returns to normal operation.

### **Multi-Segment Architecture**

The EtherHub 1500 system supports multi-segment configuration through the FlexBus 1500 cabling. Three Ethernet segments are embedded in the hub's FlexBus 1500 port providing 3 isolated segments (i.e., separate collision domains). You can choose to attach a hub to a segment, or to leave it isolated except for the management channel. Nodes attached to a specific segment (e.g., Segment 1) can only communicate with nodes attached to the same segment. This type of architecture makes the system more flexible, provides better traffic load sharing and data protection, and improves network bandwidth utilization.



Note that the EtherHub-16mi<sup>+</sup> cannot be physically isolated.

To make this architecture work for your system, plan your network setup well. Form a common domain for devices that need to communicate with each other by attaching them to the same segment. This way you can arrange network resources to balance traffic and thereby increase overall network efficiency.

To combine the segments into an interconnected network (while at the same time retaining the higher effective bandwidth and segment integrity provided by the multi-segment architecture), attach each segment to a bridge or similar interconnection device, such as Accton's Secure Backbone Hub (EtherHub-SBH) or the Smart Ethernet Switching Hub (SwitchHub-8s).

## **FlexBus 1500 Management Link**

The management link in a chain of cascaded hubs must be connected to manage the stack as a single unit. This means that only hubs connected using the FlexBus 1500 can be controlled by an SNMP management agent. At most, 10 hubs can be managed and linked together using the FlexBus 1500 connection.

## **Hub ID Setting**

In a stacked system, each hub should have a unique ID number to identify itself. The EtherHub-16i<sup>+</sup> automatically sets its Hub ID if attached to an SNMP management agent (EtherHub-16mi<sup>+</sup>) through the FlexBus 1500 port. However, for this automatic function to work, the Hub ID Setting before connecting to the agent should be set to the factory default (i.e., automatic hub ID generation; where all Hub ID LEDs are blinking). When the stack includes a EtherHub-16mi<sup>+</sup>, you can also select hub IDs using the EtherHub 1500 System Configuration Program via out-of-band or with AccView/Open via in-band communication. Refer to *Hub ID Setting* in this chapter for more information.



If the Hub ID of EtherHub-16mi<sup>+</sup> is set to factory default (i.e., 0000), it will automatically set/change this ID number to 1 when used in a stand-alone configuration.

## **SNMP Backup Agent**

The EtherHub 1500 system supports a management agent backup function. This special function allows the hub stack system to have two SNMP network management agent devices, wherein one agent is configured as a Master agent and the other as a Slave (Backup) agent. Normally, the agent in slave mode behaves as an EtherHub-16i<sup>+</sup>, but if the Master agent fails, the Slave agent takes over its functions. The data stored in the

Slave agent will be replaced by the Master agent's data. As a result, the Slave agent will assume the Master's IP address when taking over the system. To manage the stack using the out-of-band control program after the Slave has assumed control, plug your PC or modem into the DTE port of the Backup agent.

In a redundant hub stack system, only two SNMP agents are allowed, one as a Master agent and the other as a Slave agent. The Master agent's PWR/CPU LED remains steady, while the Slave agent's PWR/CPU LED flashes at a regular beat. Placing two Master agents in the same stack will cause contention, resulting in either one reverting to a Slave agent automatically. Care should be taken if this condition arises, as the system will become unstable and management data may be lost.

For instructions on how to install a Slave agent, refer to Installing an SNMP Backup Agent in Chapter 3. For instructions on how to set the Master or Slave agent using the out-of-band management program or the `Configure` button, refer to the Configuration section later in this chapter.

### **Port Backup Function**

The EtherHub 1500 system supports a port backup function (i.e., a redundancy link). A hub system can have up to 3 pairs of redundant links. These links are configurable using the in-band or out-of-band management program. When a primary link fails, the secondary link (backup) automatically takes over. Note that these links need not be physically connected to the same device.

A redundant link pair can consist of STP to STP ports, STP to ALT ports (via an appropriate MAU converter), or ALT to ALT ports. This means that a STP port linked to a particular device can have a BNC, AUI or fiber-optic port (ALT port) as backup.

## Hot Remove Function

The EtherHub 1500 system supports a “hot remove” capability that allows you to connect/disconnect the EtherHub 1500 hubs from the system without disrupting the network

## Preparing for Configuration Management

There are two methods for configuring the EtherHub 1500 system - using the out-of-band program or using the Configure button. Optional in-band network management software, AccView/Open, may also be used to configure the system. Contact your Accton dealer for more information on AccView/Open.

### Out-of-Band Configuration

Out-of-band configuration requires a computer as your working platform. There are two valid connection types to the hub:

- **Out-of-band onsite connection**  
The workstation, normally within the vicinity of the hub, is directly connected to the serial port on the hub.
- **Out-of-band modem connection**  
The workstation is connected to the remote EtherHub-16mi<sup>+</sup> via modems.

The physical setup and connections required for out-of-band management are described in greater detail under Preparing for System Configuration in Chapter 3. To open the EtherHub 1500 System Configuration Program, do the following:

1. Insert the distribution diskette provided with your hub into the PC's floppy drive.

Activate the EtherHub 1500 System Configuration Program from a local console or via modem connection as described below. This will open the communication dialog box shown in *Figure 4.1*.

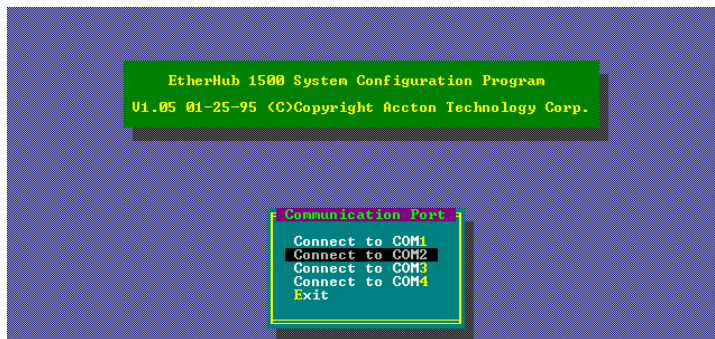
***From a local console -***

Type “EH15SCP” at the DOS prompt `C:\>EH15SCP`

***From a remote modem connection -***

- When using a PCMCIA FAX/Modem, first add the following entry to your `config.sys` file:  
`device=cardtalk.sys /A /Com3IRQ=4`
- If your PC has a PCMCIA Fax/Modem or multi-I/O card, set the proper IRQ by typing “EH15SCP/i [irq #]”. Help is available by entering “EH15SCP/?”.

To activate a selection press the keyboard character corresponding to the highlighted character on screen. Or, use the arrow keys to move to the selection and press [Enter].



*Figure 4.1 Communication Port Dialog Box*

3. Using arrow keys, select the workstation's communication port connected to the EtherHub-16mi<sup>+</sup>. The DCE/DTE dialog box will appear as shown in *Figure 4.2*.

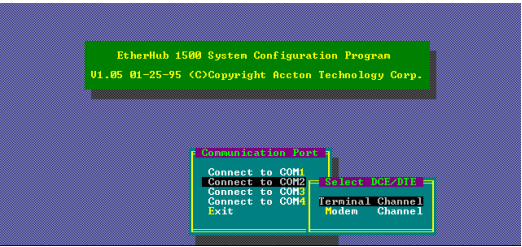


Figure 4.2 DCE/DTE Dialog Box

4. Select the appropriate option in the DCE/DTE dialog box:

- **Terminal Channel** for local hookup.
- **Modem Channel** for remote connection via modems.

Select **Modem Channel** to open the Phone List menu as shown in Figure 4.3. Enter the phone number and press [Enter] to start the dialing mechanism.

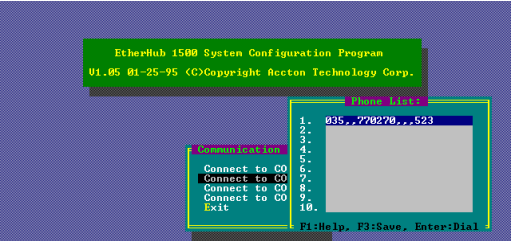


Figure 4.3 Phone List Menu

Once the connection is established, the main menu for out-of-band configuration appears as shown in Figure 4.4



Figure 4.4 Main Menu

5. Select any of the displayed menu items as described in the following section.

## EtherHub 1500 System Configuration Program (EtherHub-16mi<sup>+</sup> only)

Accton provides a proprietary, user-friendly, menu driven out-of-band program (EtherHub 1500 System Configuration Program). This program allows you to configure the stack using a PC directly attached to the RS232 port on the management device (EtherHub-16mi<sup>+</sup>) or remotely, via a modem connected to the RS232 port. With this program you can define system parameters, manage and control stacked hubs and associated ports, set threshold levels, and monitor network conditions. The following table briefly describes the menu selections available for this program.

Menu	Description
System	Provides 6 sub-menus: <i>Information</i> - Defines description for the system. <i>Configuration</i> - Sets system parameters. <i>Trap Managers</i> - Configures Communities, IP and IPX trap managers. <i>Download</i> - Downloads new version of firmware to update your system. <i>Restart</i> - Restarts your system. <i>Factory Setting</i> - Reverts all configuration selections to factory default settings.
Control	Provides 4 sub-menus: <i>Hub</i> - Isolates/attaches a hub, or sets the hub's segment. <i>Port</i> - Disables/enables a port. <i>Backup port</i> - Sets up to 3 pairs of backup ports. Each pair contains a master and slave port. The slave port is normally disabled. When master port fails, the system disables the master port and enables the slave port to maintain the link. <i>Push button</i> - Enables/disables <i>Configure</i> button to prevent unauthorized use.
Performance	Provides 4 sub-menus, namely, <i>System</i> , <i>Segment</i> , <i>Hub</i> and <i>Port</i> . This selection allows you to view network performance for the selected component. Performance is measured in terms of frames received, number of bytes, collision rate, CRC errors, alignment errors, and total errors.
Threshold	Provides 5 sub-menus - <i>System</i> , <i>Any Hub</i> , <i>Any Port</i> , <i>Select Hub</i> and <i>Select Port</i> . This menu allows you to set threshold levels for the hub or port in terms of frames received, number of bytes, collisions, CRC errors, alignment errors and total errors.
Help	On-line help
Exit	Exits the program and returns to operating system



Please refer to the README.TXT in the distribution diskette for any changes to this program that might occur after the manual is written.

## **System Menu**

<i><u>I</u>nformation</i>	Displays EtherHub system information.
<i><u>C</u>onfiguration</i>	Modifies various parameter settings necessary for communicating with the management agent.
<i><u>T</u>rap Managers</i>	Selects management stations to receive trap messages from the system.
<i><u>D</u>ownload</i>	Downloads a binary file to the SNMP agent.
<i><u>R</u>estart</i>	Resets the SNMP agent.
<i><u>F</u>actory Settings</i>	Reverts all configuration settings to the original factory settings.

## **Displaying System Information**

Use the *Information* command to display and modify system information about the EtherHub stack, or for quick system identification. View a description of the system, including:

Name	Description
System Description	Name and version of the EtherHub-16mi* software
System Uptime	Length of time the EtherHub management agent has been running (i.e., EtherHub-16mi*)
System Name	Name assigned to the EtherHub system
Contact	Contact person for the system
Location	Specifies the area or location where the system resides

### Changing System Configuration

Use the *Configuration* command from the System Menu to modify current values for the following parameters:

Parameter	Description
IP Address	IP address of the agent you're managing. The EtherHub system may be run on SNMP protocol over UDP/IP transport protocol. In this environment, all systems on the Internet, such as network interconnection devices and Network Management Stations (e.g., the PC running AccView) are assigned an IP address.
MAC Address	Hardware address of EtherHub-16mi <sup>+</sup>
Subnet Mask	Subnet mask of the agent you've selected. This mask identifies the host address bits used for routing to specific subnets.
Default Gateway	Default gateway used in passing trap messages from the EtherHub agent to the management station.
Default NMS	For internal use only.
NMS-Download File	For internal use only.
IPX Frame Type	The selected format used on the LAN; i.e., this type is that used by the IPX network where the EtherHub-16mi <sup>+</sup> is installed. If the specified frame type is not detected, the EtherHub-16mi <sup>+</sup> will automatically detect the current type. (Values: 802.3, Ethernet II, SNAP, 802.2)
IPX Network Number	Identifies the IPX network number for the connected slot.

### Assigning Trap Managers

Use the *Trap Managers* command from the System Menu to modify current values for the following parameters:

Parameter	Description
SNMP Community Names	The community strings authorized for trap management access. All community strings used for IP and IPX Trap Managers must be listed in this table.
Community Name	A community entry authorized for trap management access.
Access	Management access is restricted to read-only (RO) or read/write (RW).
Status	The status of the current entry can be set to VALID or INVALID.
IP Trap Managers	IP management stations selected to receive trap messages from the system.
IP Address	IP address of the management station.
Community Name	The community string required for trap management access.
Status	The status of the current entry can be set to VALID or INVALID.
IPX Trap Managers	IPX management stations selected to receive trap messages from the system.
Net Number	Identifies the IPX network number for the connected slot.
Node ID	MAC address of the authorized trap manager.
Community Name	The community string required for trap management access.
Status	The status of the current entry can be set to VALID or INVALID.

### **Downloading System Software**

Use the *Download* command from the System Menu to load available software updates into the agent's flash ROM. The download file should be an EtherHub 1500 \*.bin file from Accton Technology Corporation; otherwise the agent will not accept it.

Invoking this command brings up the Download dialog box. When all entries are confirmed, the display will change to show the progress of the download process. After downloading the new software, the agent will automatically restart itself. The following describes each entry in the dialog box:

Parameter	Description
Timeout	Time to wait for a response.
Retry	Number of attempts to make contact.
Filename	The *.bin file to download.
Transferred Block	Current number of data block being transferred.
Total Blocks	Total number of blocks to transfer.

### **Restarting the Agent**

Use the *Restart* command from the System menu to reset a selected agent. LEDs on the agent will light up sequentially as it executes the initialization test.

### **Reverting Configuration to Factory Settings**

Use the Factory Settings command from the System menu to change all configuration settings back to the factory defaults.

## Control Menu

<i><u>H</u>ub</i>	Includes hub description and commands to isolate/reattach network connection, or assign hub to a specified segment.
<i><u>P</u>ort</i>	Includes port description and command to enable/disable selected port.
<i><u>B</u>ackup Port</i>	Defines master/slave port pairs used for emergency backup.
<i><u>P</u>ush Button</i>	Enables/disables external Configure button on selected hub.

## Configuring Hub Parameters

Use the *Hub* command from the Control menu to configure any hub in the stack. (Select the required hub using the <F4> and <F5> function keys.) This menu provides a brief description of the selected hub, and also allows you to isolate/reattach the hub from the network.

Parameter	Description
Hub ID	Hub identifier within the stack. (Up to 10 hubs may be connected via the management channel.) Note that hub IDs can only be assigned using the Configure button as described later in this chapter.
Position	The physical position in the stack.
Name	Any user-defined name for the selected hub.
Status	The stack connection may be set to ISOLATED or ATTACHED. Note that the <i>Isolated</i> LED will be lit if the hub is isolated. (Although the status of OTHER is provided, this is for internal use only.)
Segment	Attach the hub to a specified segment. The appropriate <i>Segment</i> icon will light up to show that the hub has been connected.
Type	Indicates hub type as EH1501s, or EH1502s (Master or Slave).
Firmware Ver.	Indicates the current firmware version number.

### **Configuring Port Parameters**

Use the *Port* command from the Control menu to configure the ports for any hub in the stack. (Select the required hub using the <F4> and <F5> function keys.) This menu provides a brief description of the selected hub, and also allows you to enable/disable any port in the selected hub.

Parameter	Description
Hub ID	Hub identifier within the stack.
Position	The physical position in the stack.
Port <i>Identifier</i>	Numeric identifier 1~16 or ALT.
Name	User-defined name for selected port.
Type	Connection types include 10BASE-T (RJ-45), BNC, AUI or FIBER.
Status	Any port may ENABLED or DISABLED.
Part	Indicates if the port is partitioned.
Link State	Indicates if the port has a valid connection to an external device.

### **Defining Backup Ports**

Use the *Backup Port* command in the Control Menu to define up to three master/slave port pairs. If the connection to the master port fails, the slave port will automatically take over.

Parameter	Description
Backup Set	Defines up to three backup port pairs; each of which can be set to ACTIVE or INACTIVE.
Master Port	Pair member serving as the primary link.
Hub	Hub ID for the master port.
Port	Port identifier for the master port.
Slave Port	Pair member serving as the backup link.
Hub	Hub ID for the slave port.
Port	Port identifier for the slave port.

### Setting the External Configure Buttons

Use the *Push Button* command in the Control Menu to disable or enable the *Configure* button on any hub.

### Performance Menu

Displays statistics for the *System* (entire stack), selected *Segment*, selected *Hub*, or all *Ports* on a specified hub. (Select any segment or hub using the <F4> and <F5> function keys.)

Variable	Description <sup>1</sup>
Frames	Number of frames passing through this device.
Bytes	Number of bytes passing through this device.
Collisions	Number of simultaneous node transmissions detected by this device.
Allignment Errors	Number of mis-synchronized data packets detected by this device.
CRC Errors	Number of Ethernet Cyclic Redundancy Code errors detected by this device.
Total Errors	Total number of errors, including FCS, allignment, FramesTooLong, ShortEvents, LateEvents, Jabber, and DataRateMismatches detected on this device.

<sup>1</sup> - The values displayed have been accumulated since the last system reboot or counter reset.

### Threshold Menu

Select the *Threshold* command from the menu bar to define limits for the parameters monitored by the hub system. Limits can be set for the *System* (entire stack), *Any Hub* or *Any Port*, or a *Select Hub* or *Select Port*. Variables to monitor include frames, bytes, collisions, frame allignment errors, CRC errors or total errors. High and low watermarks may be set. While the trigger action includes warning, warning and isolate (for hubs), or warning and disable (for ports). When any threshold is exceeded, the agent will issue an alarm to the network management station based on the selected action.

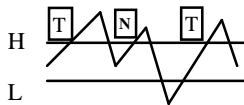
**To set thresholds,**

1. Open the *Threshold* dialog box from the menu bar.
2. Select the system component (Type: System, Any Hub, Any Port, Select Hub, Select Port). If you choose Select Hub or Select Port, then choose the Hub ID or Port ID using the <F2> function key.
3. Select the variable to monitor (Variable: Frames, Bytes, Collisions, Alignments, CRCs or Total Errors). If you choose Select Hub or Select Port, then choose the variable Type using the <F2> function key.
4. Input a decimal value for the low and high watermarks.
5. Select the appropriate action (Action: INACTIVE, WARNING, WARNING & ISOLATE for hubs, or WARNING & DISABLE for ports).
6. Implement your settings by pressing the <F3> function key.

**Available Threshold Parameters for Hubs and Ports**

Parameter	Description
Frame	The total number of frames.
Bytes	The total number of bytes.
Collisions	Multiple packets transmitted over a medium at the same time, making them unintelligible.
Alignments	Frame alignment errors occur when the received frame is a multiple of 8 bits.
CRCs	This error occurs when the cyclic redundancy code for a frame is wrong. (The cyclic redundancy code an error-checking algorithm used to indicate frame reception errors.)
Total Errors	The total number of collisions, frame alignment errors and CRC errors.

T: triggered N: not triggered

**Event Activation**

After initial event activation (i.e., crossing the high watermark), the monitored variable must reach the low watermark before another event is activated (i.e., again crossing the high watermark).

**Notes about the hub and port threshold parameters,**

- The rate for all values is per one second.
- Threshold entries are stored in the agent.

## Using the Configure Button

Depending on the model you purchased, there are 5 (EtherHub-16i<sup>+</sup>) or 6 (EtherHub-16mi<sup>+</sup>) configuration functions accessed in sequence using the Configure button, including:

- Segment Setting
- Hub ID Setting
- Master Agent Setting (EtherHub-16mi<sup>+</sup> only)
- Demo Function
- Diagnostic Function
- Reset Function.

A "*long press*" on the button allows you to switch from one function to the next. While a "*short press*" switches between selections within each function. LED indicators light up to indicate which configuration function the system is in.



To avoid unauthorized configuration changes, you may disable the *Configure* button via the out-of-band configuration program or via the AccView in-band network management program.

Before using the Configure button, remember that:

- A "*long press*" means pressing the Configure button for more than 2 seconds and then releasing the button. While a "*short press*" means pressing the Configure button and immediately releasing it.
- A "*long press*" has 2 functions. **(1)** It works like an *[Enter]* key — implementing the last selection displayed by the LED indicators for the current function. **(2)** It brings the system to the next configuration function.

- A "*short press*" is used to switch **between the selections** available **within each function**. For example, in Segment Setting, there are 4 selections available. By using a "short press" on the Configure button, you can move from one selection (e.g., Attach hub to Segment 1) to the next (e.g., Attach hub to Segment 2). Note, however, that a selection will only take effect after a "*long press*" on the Configure button.
- If the button is not pressed within 10 seconds, the system returns to normal operation effecting all changes made prior to selecting the current function.

**To summarize,**

1. Access configuration functions by using a "*long press*". LEDs light up to indicate the current configuration function. (Example: Hub ID LEDs will display a combination of BLINKING/OFF lights to indicate that the system is in Hub ID Setting mode.)
2. Compare the LED display you see on the hub's front panel with the appropriate LED display in the succeeding pages. Each LED display corresponds to a selection within a function. (Example: If the system is in Segment Setting function, see the LED display table under Segment Setting Function in this chapter).
3. If you want to implement the selection displayed for your hub, proceed to step 4. Otherwise, move to the next selection using a "*short press*". Repeat a "*short press*" until you find the selection you want.
4. To implement your selection and continue on to the next function, use a "*long press*".

### **Selections Available**

This section shows the selections available for each function and the corresponding LED display. The functions are listed here in sequence.

#### ***Segment Setting***

Active LEDs: Segment LEDs

Attach the hub to one segment.

Segment LED 1	Segment LED 2	Segment LED 3	Segment Number Selection
Blinking	OFF	OFF	Attach hub to Segment 1 (DEFAULT)
OFF	Blinking	OFF	Attach hub to Segment 2
OFF	OFF	Blinking	Attach hub to Segment 3
Blinking	Blinking	Blinking	Isolated from all segments*

Note: When the Isolated indicator on the front panel is lit, the segment indicators reflect the previous setting and should be ignored.

#### ***Hub ID Setting***

Active LEDs: Hub ID LEDs

After setting the segment, the system enters the Hub ID function. For initial configuration, the Hub ID LEDs will all be blinking (automatic Hub ID Setting). Otherwise, you will see a combination of blinking and OFF LEDs. Refer to the following table for the hub ID Number and its corresponding LED display.

Hub ID LED 1	Hub ID LED 2	Hub ID LED 4	Hub ID LED 8	Hub ID Number Selection
BLINKING	BLINKING	BLINKING	BLINKING	Automatic Hub ID setting (DEFAULT).
BLINKING	OFF	OFF	OFF	Hub ID 1
OFF	BLINKING	OFF	OFF	Hub ID 2
BLINKING	BLINKING	OFF	OFF	Hub ID 3
OFF	OFF	BLINKING	OFF	Hub ID 4
BLINKING	OFF	BLINKING	OFF	Hub ID 5
OFF	BLINKING	BLINKING	OFF	Hub ID 6
OFF	BLINKING	BLINKING	OFF	Hub ID 6
BLINKING	BLINKING	BLINKING	OFF	Hub ID 7
OFF	OFF	OFF	BLINKING	Hub ID 8
BLINKING	OFF	OFF	BLINKING	Hub ID 9
OFF	BLINKING	OFF	BLINKING	Hub ID 10

Note: When the EtherHub-16mi+ is in a stand-alone configuration, the Automatic Hub ID function will set it to Hub ID 1.

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## EtherHub 1500 System User's Guide

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### **Master Agent Setting** (EtherHub-16mi<sup>+</sup> only)

Active LEDs: PARTITION/DISABLE LED 1  
LINK/TRAFFIC LED 1 (labeled Master )

You can set the hub as a Master (main) or Slave (backup) agent.  
If the Master agent fails, the Slave agent takes over its functions.

LED	Activity	Selection
LINK/TRAFFIC LED 1	BLINKING	Set hub as Master Agent
PARTITION/DISABLE LED 1	BLINKING	Set hub as Slave Agent

 For EtherHub-16i<sup>+</sup> users, proceed to the next function (Demo).

### **Demo function**

Active LEDs: PARTITION/DISABLE LED 1 (EtherHub-16i<sup>+</sup>)  
PARTITION/DISABLE LED 2 (EtherHub-16mi<sup>+</sup>)  
LINK/TRAFFIC LED (labeled Demo)

Enabling the Demo function will light up all LEDs one at a time. The LED display will continue until the Demo function is disabled using the Configure button (PARTITION/DISABLE LED is OFF).

LED	Activity	Selection
LINK/TRAFFIC LED 1 or 2	BLINKING	Enable Demo function
PARTITION/DISABLE LED 1 or 2	BLINKING	Disable Demo function

***Diagnostic function***

Active LEDs: PARTITION/DISABLE LED 2 (EtherHub-16i<sup>+</sup>)  
PARTITION/DISABLE LED 3 (EtherHub-16mi<sup>+</sup>)  
LINK/TRAFFIC LED (labeled Diag)

Enabling the Diagnostic function will activate diagnostic tests similar to the one performed upon power on. For diagnostic test details, refer to the section on Diagnostic Tests earlier in this chapter. After successfully completing Diagnostics, the system returns to normal operation.

LED	Activity	Selection
LINK/TRAFFIC LED 2 or 3	BLINKING	Enable Diagnostic function
PARTITION/DISABLE LED 2 or 3	BLINKING	Stop Diagnostic function

***Reset function***

Active LEDs: PARTITION/DISABLE LED 3 (EtherHub-16i<sup>+</sup>)  
PARTITION/DISABLE LED 4 (EtherHub-16mi<sup>+</sup>)  
LINK/TRAFFIC LED (labeled Reset)

Activating the Reset function will revert all selections (made using the Configure button or by management software) to factory default settings. To avoid unintentionally resetting the hub, after you enable the Reset function using standard procedures, use short presses on the Configure button to light LINK/TRAFFIC LED 15 and then use a long press to confirm your action.

LED	Activity	Selection
LINK/TRAFFIC LED 3 or 4	BLINKING	Enable Reset function
PARTITION/DISABLE LED 3 or 4	BLINKING	Stop Reset function



There are some selections made during configuration or system management which remain in memory even if the hub is powered off and on. For example, a port disabled using SNMP management software (e.g., AccView/Open) will remain disabled even if the hub is powered off and then on. It can only be enabled by using the management software or resetting the hub.



Be careful in using the Reset function. Otherwise, you might erase all the configuration settings you have made.

## Chapter 5: Applications

The EtherHub 1500 series stackable hubs are designed to provide network installers flexibility in configuring their network connections. A hub can be used as a simple stand-alone hub or connected with other hubs using various configurations. This chapter includes network applications using the multi-segment architecture.

### Attaching Stack to One Segment

You can attach all hubs in a stacked system to the same segment. In this example, a stacked system using the FlexBus 1500 port connection is connected to segment 1.

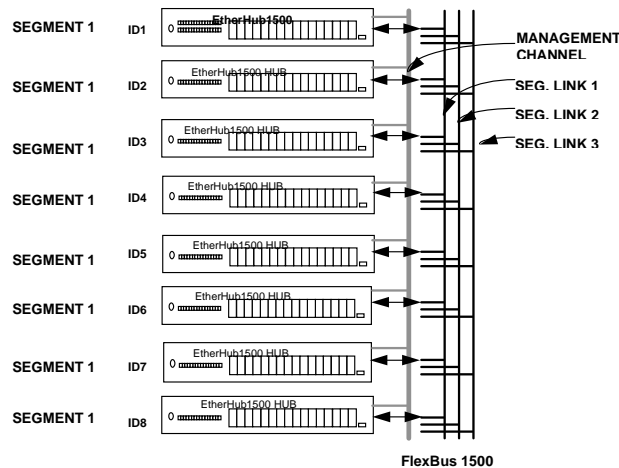


Figure 5.1 Attaching All Hubs in Stack to One Segment

## Attaching Stack to Three Segments

This example shows 3 independent Ethernet LANs in a stacked system. Hubs 1, 2 and 3 are attached to segment 2, while hubs 4 to 7 are attached to segment 1, and hubs 8 to 10 are attached to segment 3.

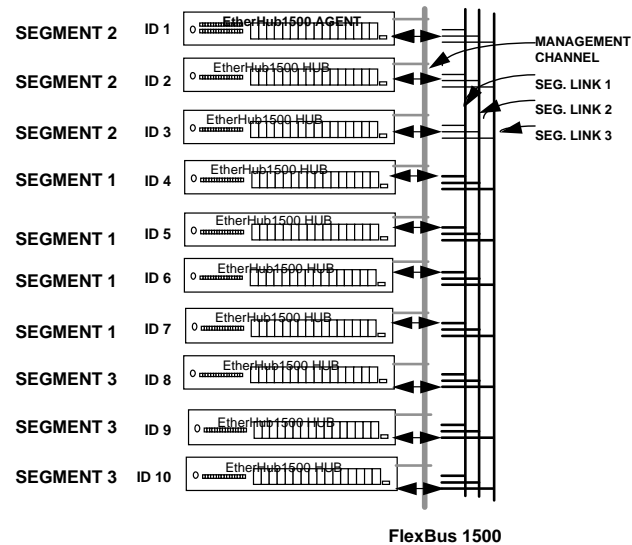


Figure 5.2 Attaching Hubs in Stack to 3 Segments

# Attaching Stack to Multiple Segments

You can interconnect the hubs in a stack using a multi-segment configuration. In a stacked system, some hubs may be connected to a segment while others are isolated (not attached to a segment). In this example, hubs 1 and 2 are attached to segment 2, hubs 3 to 5 are attached to segment 1, and hubs 6 to 8 are attached to segment 3. However, hubs 9 and 10 are not connected to any segment. These hubs form isolated segments.

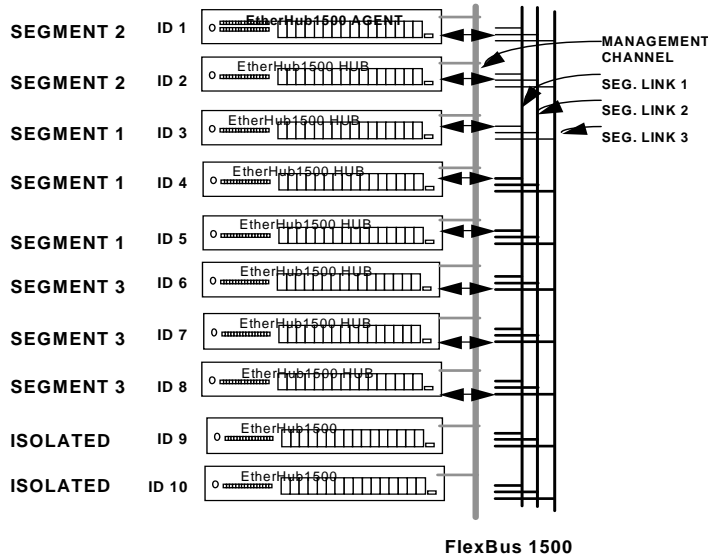


Figure 5.3 Linking Part of the Stacked Hubs to a Segment

## Each Hub is Isolated

In this example, each hub in the stack is an independent segment (isolated). Hubs 2 to 10 are not connected to any of the 3 segments embedded in the FlexBus 1500 cabling; while the EtherHub-16mi<sup>+</sup> (EtherHub 1500 Agent), though attached to Segment 1, is functionally isolated.

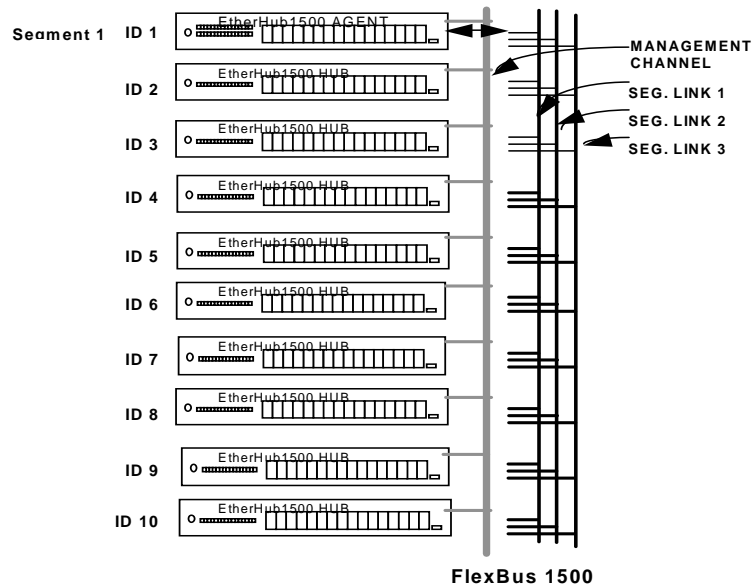


Figure 5.4 Stacked Hubs Not Linked to a Segment



The EtherHub-16mi<sup>+</sup> is designed to be attached to one of the 3 segments. In this example, the EtherHub-16mi<sup>+</sup> is functionally isolated though attached to a segment. Traffic in each segment is restricted to that segment and cannot pass to another segment without a device such as Accton's Secure Backbone Hub (EtherHub-SBH) or Smart Ethernet Switching Hub (SwitchHub-8s) to link them.

## Extending the Network with STP/BNC Connections

Extend your network by connecting any of the hubs in a stacked system to other compatible hubs using the STP and/or ALT port connections. In the diagram below, a stand-alone hub is connected to hub 5 in the stacked system using the STP connection. The other stand-alone hub is connected to hub 8 in the stacked system using a BNC connection. However, the EtherHub 1500 Agent can only manage hubs connected to it through the FlexBus 1500 connection.

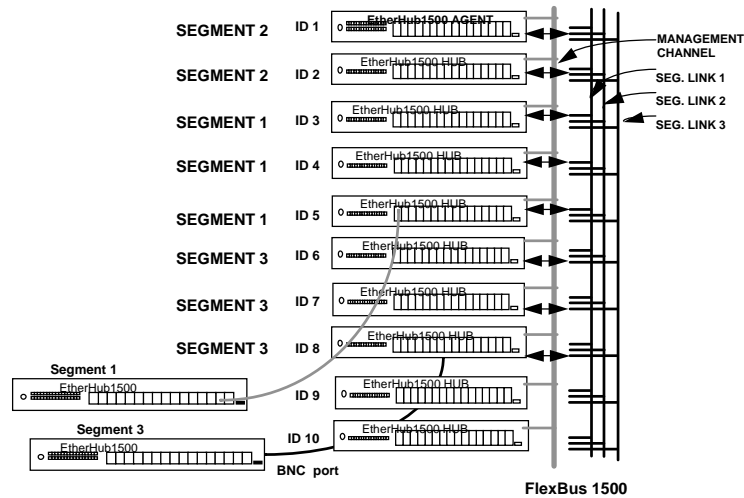


Figure 5.5 Linking Stacked Hubs to Unmanaged Hubs with STP Port Connection

## Linking a Stack to a Network Management Station

In a stacked system, connect the in-band management workstation to the same segment that the management agent is attached to. In this example, the management agent is attached to segment 1. Thus, the in-band management workstation (e.g., running AccView/Open) should also be connected to segment 1.

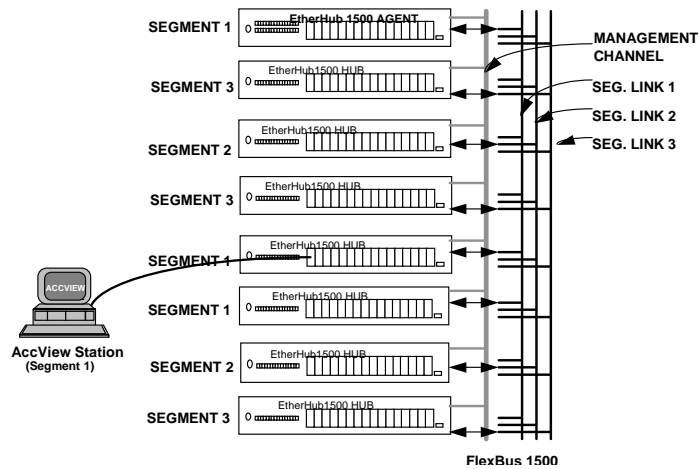


Figure 5.6 Linking Stacked Hubs to a Network Management Station

## Interconnecting Segments

The 3 segments within a stacked system can be combined into an interconnected network using Accton's EtherHub-SBH. Connect the EtherHub-SBH to the hub management agent as illustrated below.

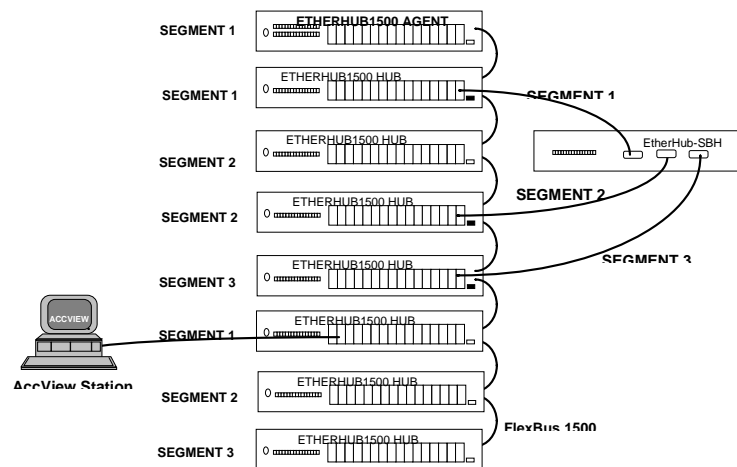


Figure 5.7 Linking Segments in a Stacked System

## Linking a Distributed Segment

Hubs installed at various locations can be managed by a single EtherHub 1500 Agent when they are connected to the Agent via a FlexBus 1500 port connection. Hubs can be connected to a single-segment domain (i.e., one segment common to all hubs controlled by the management agent) or can remain isolated. The maximum segment length using FlexBus 1500 cabling linking the distributed hubs is 100 meters.

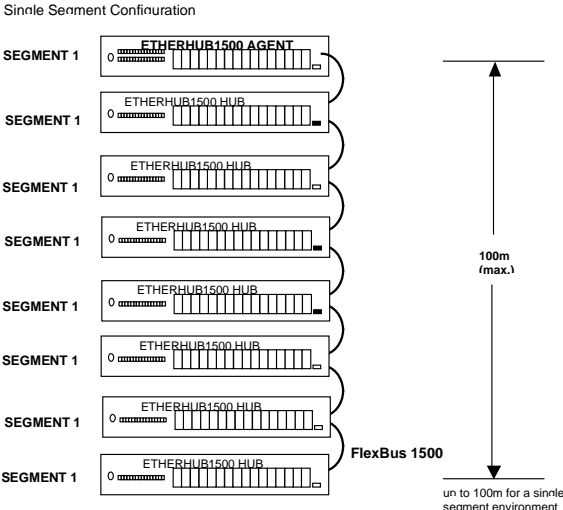


Figure 5.8 Linking a Distributed Segment

# Linking Distributed Segments

Hubs installed at various sites can be managed by a single EtherHub 1500 Agent when they are connected to the Agent via the FlexBus 1500 port connection. However, all hubs must be connected to the same segment at the central site. The segment setting for hubs at all other sites must be set to isolated. (Refer to the Segment Setting function in Chapter 4.) Hubs within the remote stacks can remain isolated or be connected to hubs within the same location using the STP daisy-chain or the ALT PORT connection. The maximum segment length using FlexBus 1500 cabling linking the distributed hubs is 100 meters.

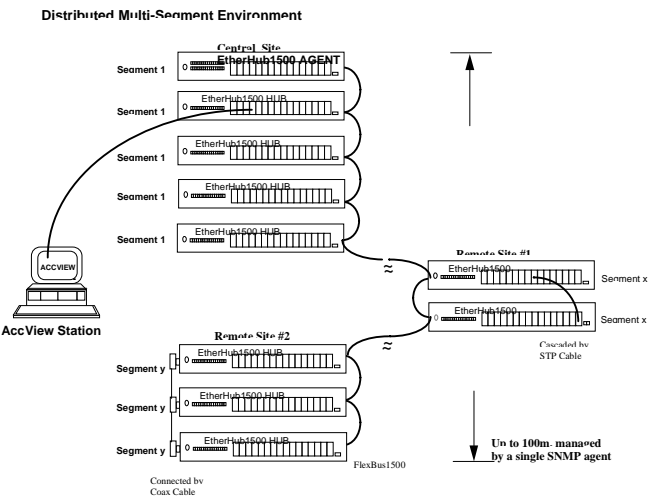


Figure 5.9 Linking Distributed Multi-Segments

# Appendix A:

## Product Specifications

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### Features

Expansion	Up to 10 modules (170 station ports)
Expansion Interface	FlexBus™ 1500 cable
Segmentation	Supports 3 or more segments in a stack
Fault Tolerance	Hot swappable modules; backup SNMP agent and redundant port link (for EtherHub-16mi <sup>+</sup> )

### Physical Characteristics

Station Ports	16 10BASE-T (RJ-45)
Backbone Port	Optional
Serial Port	Out-of-band management
System Power	100V - 260V AC (±10%), 50- 60 Hz (±3 Hz)
Temperature	0° to 50° C (Standard Operating)
Humidity	5% to 95% (Noncondensing)
Dimensions	440mm x 171mm x 43mm (17.32" x 6.73" x 1.69")
Microprocessor	8031 (EtherHub-16i <sup>+</sup> ); 80188 (EtherHub-16mi <sup>+</sup> )
Configuration	Automatic hub-ID and bus termination; front panel configuration
SmartWatch™	Comprehensive array of 58 LEDs including network utilization, collision rate, link/traffic, partitions/disable, 4 module IDs, 3 segments, power/CPU, interhub, serial port, alert, SNMP or monitor, terminator, jabber

## Specifications for FlexBus 1500 Cable

The FlexBus 1500 is a category 5 STP cable used to connect stacked EH1500+ or compatible hubs. It supports segment configuration setup and management functions for EH1500+ or compatible hubs. Its specifications are listed below:

<b>Cable</b>	performance level	high-performance data grade
	conductor	8-wire, 4-pair, 24 AWG stranded bare copper
	insulation	polyolefin
	shield	overall aluminum foil
	jacket	PVC
	operating frequency	100 MHz Max
	impedance	$102 \pm 15\%$ Ohms
	attenuation	5.5 dB/1,000 ft

**Plug** 8-wire shielded modular plug for stranded twisted-pair cable

No special tools are required to install the FlexBus 1500 cable. These cables are terminated on the plugs in advance.

Tables A-1 and A-2 list the attenuation and near-end crosstalk (NEXT) loss v.s. reference frequency. Attenuation is derived from swept frequency signal level measurements at the output of 305m (1000 ft) of cable. The maximum attenuation for any pair shall be less than the values given in Table A-1 for the frequency range of 0.772 MHz to the highest referenced frequency.

Near-end crosstalk (NEXT) is derived from swept frequency measurements using a network analyzer or an s-parameter test set. A balanced signal is applied to a pair that causes disturbance while the crosstalk signal is measured at the output port of the pair being disturbed at the near end of the cable.

### **Attenuation for Horizontal FlexBus 1500 Cable**

Maximum Attenuation in dB for 305m (1000ft) of cable @ 20°C

Frequency (MHz)	db
0.064	2.2
0.256	3.2
0.512	4.5
0.772	5.5
1	6.3
4	13
8	18
10	20
16	25
20	28
25	32
31.25	36
62.5	52
100	67

Table A-1

### **NEXT for Horizontal FlexBus 1500 Cable**

Worst Pair NEXT Loss in dB @ 305m (1000ft)

Frequency (MHz)	db
0.064	2.2
0.256	3.2
0.512	4.5
0.772	5.5
1	6.3
4	13
8	18
10	20
16	25
20	28
25	32
31.25	36
62.5	52
100	67

Table A-2

## Standards Compliance

Standards	Ethernet-IEEE 802.3 Repeater Standard and Repeater Management Standard	
Safety	UL 1950	USA
	CSA 22.2-950	Canada
	TÜV/GS/EN60950	Germany
	IEC 950	International
Electromagnetic	Emissions	FCC Class A
	Electrostatic	IEC 801.2, EN55101-2
	RS	IEC 801.3, EN55101-3
	EFT/Noise	IEC 801.4, EN55101-4
Environmental	Vibration	IEC 68-2-34
	Shock	IEC 68-2-27
	Drop	IEC 68-2-32

## Appendix B: Pin Assignments

---

The following table lists the pin assignments for each pair used in the FlexBus 1500 cable.

### FlexBus 1500 Pin Description

FlexBus 1500 4-pair Wiring Color Codes & Functions

Pair	Pin	Color	Function
1	4 5	White/Blue Blue/White	Segment 2
2	1 2	White/Orange Orange/Blue	Segment 3
3	3 6	White/Green Green/Blue	Segment 1
4	7 8	White/Brown Brown/Blue	Management

The following tables describe the port pins for the EtherHub-16mi<sup>+</sup> (EH1502s). The EtherHub-16i<sup>+</sup> uses standard port pin assignments.

### RS232 Port Pin Description

EIA Circuit	CCITT Signal	Description	EH1502s DB9 DTE Pin #	PC DB9 DTE Pin #	Modem DB25 DCE Pin #	Signal Direction DTE -DCE
CF	109	DCD (Data Carrier Detected)	1	1	8	< -----
BB	104	RxD (Received Data)	2	2	3	< -----
BA	103	TxD (Transmitted Data)	3	3	2	----- >
CD	108.2	DTR (Data Terminal Ready)	4	4	20	----- >
AB	102	SG (Signal Ground)	5	5	7	-----
CC	107	DSR (Data Set Ready)	6	6	6	< -----
CA	105	RTS (Request-to-Send)	7	7	4	----- >
CB	106	CTS (Clear-to-Send)	8	8	5	< -----
CE	125	RI (Ring Indicator)	9	9	22	< -----

### DB9 Serial Port to RJ-45 Converter Connector Pin Assignment

Description	RJ-45 Pin Mapping	EH1502s DB9 Connector
DTR (Data Terminal Ready)	1	4
RxD (Received Data)	2	2
TxD (Transmitted Data)	3	3
SG (Signal Ground)	4	5
RI (Ring Indicator)	5	9
CTS (Clear-to-Send)	6	8
RTS (Request-to-Send)	7	7
DCD (Data Carrier Detected)	8	1
DSR (Data Set Ready)	NC	6

### DB9 PC's COM Port to RJ-45 Converter Connector Pin Assignment

Description	RJ-45 Pin Mapping	EH1502s DB9 Connector
DTR (Data Terminal Ready)	1	6
RxD (Received Data)	2	3
TxD (Transmitted Data)	3	2
SG (Signal Ground)	4	5
RI (Ring Indicator)	5	9
CTS (Clear-to-Send)	6	7
RTS (Request-to-Send)	7	8
DCD (Data Carrier Detected)	8	1
DSR (Data Set Ready)	NC	4

### DB25 RS232 to RJ-45 Converter Connector Pin Assignment

Description	RJ-45 Pin Mapping	EH1502s DB25 Connector
DTR (Data Terminal Ready)	1	20
RxD (Received Data)	2	3
TxD (Transmitted Data)	3	2
SG (Signal Ground)	4	7
RI (Ring Indicator)	5	22
CTS (Clear-to-Send)	6	5
RTS (Request-to-Send)	7	4
DCD (Data Carrier Detected)	8	8
DSR (Data Set Ready)	NC	6

### Connection from EH1502s 9-Pin Serial Port to PC's 9-Pin COM Port

EH1502's 9-Pin Serial Port		PC's 9-Pin COM Port
1 DCD	----- DCD -----	1
2 RXD	<----- TXD -----	3
3 TXD	----- RXD ----->	2
4 DTR	----- DSR ----->	6
5 SGND	----- SGND -----	5
6 DSR	----- DTR -----	4
7 RTS	----- CTS ----->	8
8 CTS	<----- RTS -----	7
9 RI	----- RI -----	9

### Connection from EH1502 9-Pin Serial Port to Modem's 25-Pin DCE Port

EH1502's 9-Pin Serial Port		Modem's 25-Pin DCE Port
1	< ----- DCD -----	8
2	< ----- RXD -----	3
3	----- TXD ----- >	2
4	----- DTR ----- >	20
5	----- SGND -----	7
6	< ----- DSR -----	6
7	----- RTS ----- >	4
8	< ----- CTS -----	5
9	< ----- RI -----	22

# **Appendix C:**

## **Product Support Services**

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### **Product Registration**

Fill in the Owner Registration Card and mail it to Accton Technology Corporation. Accton will keep your record and inform you of any new Accton unit developments.

### **Problem Report**

If problems occur during unit operation, please check the adapter configuration settings, cables, connectors, network terminators, hardware compatibility and other network components.

Write a description of the problem, including what problems occurred, when they occurred, duration of the problems, the unit number, serial number, hardware, software and the DOS version that you are using. Then contact your dealer or Accton Technology Corporation for assistance.

### **Hardware Repair Service**

You must get an RMA (Return Materials Authorization) number before returning any hardware for repair. To obtain this number please inform Accton of your company name, address, unit name and model number, contact person, telephone number, and a problem description list. If your unit is under repair warranty you must also give your purchase date. Carefully pack your hardware. If possible, use the original carton. Mark the RMA number on the carton and send it to your dealer.

After repair, Accton will inform you of the date of delivery and the exact amount due. Please send the payment by T/T (Telegram Transfer), and Accton will send you the fixed component after receiving payment. With or without warranty, if the hardware is found to be free of defects, you will only be charged for testing and handling.

## **Software Update and Upgrade Service**

Accton constantly improves its software units by adding enhancements and new features. Minor software updates are free of charge. If greater changes have been made to the software, Accton offers software upgrade services at a specially reduced price.

## **Bulletin Board Service (BBS)**

- In countries other than the U.S., call 886-35-770-654 to reach Accton Taiwan's modem line. Modems with 14400 through 2400 baud are supported. Choose 8 data bits, 1 stop bit and no parity. Standard VT100 terminal emulation is supported
- In the United States, call 408-452-8828 to reach the Accton USA's BBS line. Modems with 14400 through 2400 baud are supported. Choose 8 data bits, 1 stop bit and no parity. Standard VT100 terminal emulation is supported.

## Interactive Fast Fax (U.S.A. office)

Printed technical documentation can be FAX'ed to your FAX machine, 24-hours a day.

- Call 408-452-8811 to reach Accton's interactive Fast FAX service. You will need a Touch-Tone phone and a FAX machine (or equivalent). Choose document 911 for a listing of technical bulletins.

## Technical Support

Your dealer or installer is the person who understands your network and Accton units. If neither is available to help you, Accton technical support engineers are available by FAX, mail or phone.

- Send your technical questions by FAX to:  
International Headquarters: 886-35-770-267  
USA Headquarters: 408-452-8988
- To obtain software upgrades connect via ftp to ftp.accton.com.tw
- Send your technical questions by email to support@accton.com.tw
- Mail your technical questions to:

<b>International Headquarters</b> Accton Technology Corporation Attn: Technical Support No. 1 Creation Road III Science-based Industrial Park Hsinchu 300, Taiwan, R.O.C.	<b>USA Headquarters</b> Accton Technology Corporation Attn: Technical Support 1962 Zanker Road, San Jose, CA 95112, U.S.A.
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During local business hours, call:

<b>International Headquarters</b> (Monday through Friday, 8 am to 6 p.m.): 886-35-770-270	<b>USA Headquarters</b> (Monday through Friday, 7 am to 5 p.m. Pacific Time): 408-452-8900 or 800-926-9288
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## Limited Warranty

Accton warrants to the original owner that the product delivered in this package will be free from defects in material and workmanship for the lifetime of the product. For the warranty to apply, you must register your purchase by returning the registration card indicating the date of purchase and including proof of purchase. There will be a minimal charge to replace consumable components, such as fuses, power transformers, and mechanical cooling devices. The warranty does not cover the product if it is damaged in the process of being installed. Accton recommends that you have the company from whom you purchased this product install it.

THE ABOVE WARRANTY IS IN LIEU OF ANY OTHER WARRANTY, WHETHER EXPRESS, IMPLIED OR STATUTORY, INCLUDING BUT NOT LIMITED TO ANY WARRANTY OF MERCHANTABILITY, FITNESS FOR A PARTICULAR PURPOSE, OR ANY WARRANTY ARISING OUT OF ANY PROPOSAL, SPECIFICATION OR SAMPLE. ACCTON SHALL NOT BE LIABLE FOR INCIDENTAL OR CONSEQUENTIAL DAMAGES. ACCTON NEITHER ASSUMES NOR AUTHORIZES ANY PERSON TO ASSUME FOR IT ANY OTHER LIABILITY.

## Customer Remedies

If the product is found to be defective within the first two years from the later of date of purchase or date of manufacture, Accton's entire liability and your exclusive remedy for any breach of warranty, shall be, at its option, to repair or replace the product at no charge except as set forth below. If the product is found to be defective after two years from the later of date of purchase or date of manufacture, Accton will charge a process and handling fee, provided that you deliver the product along with a return material authorization (RMA) number either to the company from whom you purchased it or to Accton. Accton warrants the repaired or replaced product to be free from defects in material and workmanship for the remainder of the original product's warranty period. Consumable components are warranted only for two years.

## **Return Process**

Before you may return any Accton product to Accton, you must request an RMA number by calling, FAXing or writing Accton's Service Department at the address listed below. If you ship the product, you must assume the risk of damage or loss in transit. You must use the original container (or the equivalent) and pay the shipping charge. Accton may replace or repair the product with either a new or reconditioned product, and the returned product becomes Accton's property. At Accton's sole discretion, Accton will issue a credit for either a comparable replacement Accton product or credit the original purchase price towards the purchase of any Accton product for any unrepairable, defective product.

This warranty does not cover replacement of products damaged by abuse, accident, misuse, neglect, alteration, repair, disaster, improper installation or improper testing.

ACCTON SHALL NOT BE HELD LIABLE FOR ANY LOSS OF PROFITS, LOSS OF USE, INCIDENTAL, CONSEQUENTIAL OR SPECIAL DAMAGES CAUSED BY THE USE OF THIS PRODUCT OR INABILITY TO USE IT, EVEN IF THE COMPANY OR ACCTON HAS BEEN ADVISED OF SUCH LIABILITY OR OTHER SPECIAL CLAIMS.

If you purchased this product in the USA, be aware that some states do not allow limitations on how long an implied warranty lasts, so the above limitations may not apply to you. Some states do not allow the exclusion or limitation of incidental or consequential damages, so the above limitations or exclusions may not apply to you. This warranty gives you specific legal rights and you may have other rights which vary from state to state. All parts or components contained in this product are covered by Accton's Limited Lifetime Warranty for this product. The product may contain fully tested, recycled parts, warranted as if new.

### **For warranty information:**

#### **All territories except North and South America:**

Accton Technology Corporation, International Headquarters  
No. 1, Creation Rd. III, Science-based Industrial Park, Hsinchu 300, Taiwan, R.O.C.  
Phone: 886-35-770-270 Fax: 886-35-770-267 BBS: 886-35-770-654

#### **North and South America:**

Accton Technology Corporation, USA Headquarters  
1962 Zanker Road, San Jose, CA 95112, U.S.A.  
Phone: 408-452-8900 Fax: 408-452-8988 BBS: 408-452-8828

## Ordering Information

- **EtherHub-16i<sup>+</sup>** (EH1501s) Intelligent 16-port 10BASE-T (RJ-45) multi-segment Ethernet hub with one 10BASE2 (BNC) backbone port
- **EtherHub-16mi<sup>+</sup>** (EH1502s) Intelligent 16-port 10BASE-T (RJ-45) multi-segment hub with one 10BASE2 (BNC) backbone port and SNMP agent
- **Alternative Module for Backbone Port**
  - EH1552 AUI transceiver interface module
  - EH1553 Fiber-optic transceiver ST connector interface module
- **EtherHub-SBH** (EH2001) Secure multi-segment backbone hub
- **SwitchHub-8s** (EH2002) 8-port smart Ethernet switching hub
- **AccView/Open** (SW6102) Windows-based network management software
- **EtherHub 1500 Security Module** (SW7300) Security kit for intrusion and eavesdropping protection

# Glossary

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## **10BASE-T**

IEEE's specifications for running Ethernet using twisted-pair.

## **AccView/Open**

AccView/Open is a complete network management product with modules for managing Accton devices.


## **Alt Port**

An optional port found on the backplane of the EtherHub. A BNC, AUI or Fiber-Optic module can be installed in the ALT port.

## **AUI (attachment unit interface)**

A 15-pin interface specified by the IEEE 802.3 standard for connecting a PC, server, or other device to an Ethernet transceiver or Media Access Unit (MAU).

## **Daisy-Chain Port**

STP Port 16 of the EtherHub. When the daisy-chain switch is set to OUT (e.g., ) Port 16 can be used to connect the EtherHub to other compatible hubs in a daisy-chain configuration.

## **EtherHub 1500 System**

Accton's LAN enhancement and management products. Each component in the system carries a multi-segment bus architecture that enhances traffic management and network bandwidth utilization.

## **EtherHub-16i<sup>+</sup>**

Accton's 16-port intelligent 10BASE-T hub. It is a component of Accton's EtherHub 1500 System.

## **EtherHub-16mi<sup>+</sup>**

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## **EtherHub 1500 System User's Guide**

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A 16-port intelligent hub with an SNMP-based network management agent. It is a component of Accton's EtherHub 1500 System.

### **Ethernet**

A network communication system developed and standardized by DEC, Intel, and Xerox, using baseband transmission, CSMA/CD access, logical bus topology, and coaxial cable. The successor IEEE 802.3 standard provides for integration into the OSI model and extends the physical layer and media with repeaters and implementations that operate on fiber optics, broadband, and unshielded twisted-pair.

### **FlexBus 1500 Ports**

STP ports found at the backplane of the EtherHub labeled BUS IN and BUS OUT. These ports are used for linking the hub to other compatible hubs using Accton's FlexBus 1500 STP cable.

### **Jabber**

Refers to an abnormal Ethernet frame transmission. The frames causing jabber are normally much too long. It may come from a malfunctioning Ethernet card and may cause data loss for all network users.

### **LED**

Light emitting diode on the front panel of the EtherHub used for monitoring a hub or network condition. A LED display corresponds to a hub condition.

### **MIB**

An acronym for Management Information Base. It is a set of database objects that contains information about the device. Note that MIB II and Bridge MIB are simply subordinate components of the overall MIB.

### **Multi-Segment Architecture**

Type of architecture that enhances traffic management and network bandwidth utilization by segregating network traffic.

**Network Management Station**

The computer used to run AccView/Open. It is used by the network manager to monitor the network.

**Out-of-Band**

A way of communicating with a network device from outside the standard network channels.

**RJ-45 Connector**

Most common terminator for unshielded twisted-pair wiring.

**RS232 Serial Port**

An interface where data moves over the same wire bit-by-bit.

**Simple Network Management Protocol (SNMP)**

The application protocol offering network management services in the Internet suit of protocols.

**Shielded Twisted-Pair (STP)**

Twisted-pair wire covered with an external aluminum-foil or woven-copper shield designed to reduce excessive noise pick up or radiation.

**Terminator**

A resistor placed at each end of an Ethernet cable to make sure that signals do not reflect back and cause errors.

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